



Some Mistakes Made by Dr. Clapp in the American Text-Book of Operative Dentistry.*

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In looking over the six different dental journals for which I subscribe, I note that much has been published of late, on combination fillings. In conversing with a number of dentists, I find they use the American Text-Book as a basis for their work and allege, that, as it is the latest book on operative work, it is an authority. Some few to whom I have had the pleasure of giving instruction have even said that, "unless Dr. Clapp knew what he was writing about, was, in fact, perfectly informed in regard to combination fillings, the chapter devoted to this particular line of work would not be in the book."

There are a few theories advanced in this chapter which, I hold, should never have been advanced. Experiments show conclusively that these theories are devoid of a substantial foundation. I have waited patiently since last October for some one else to point out the mistakes in this chapter, but as it has not, to my knowledge, been done, I feel that I can no longer keep silent.

I do not know Dr. Clapp, so that my criticism is in no sense personal. I speak for those younger than myself. Those who have had twenty or twenty-five years of experience in the profession and who have studied to keep abreast of the times know these mistakes. They know also what combination fillings are and where and where not to use them; but the younger men of the profession may not know this and they should be warned against some of the errors that they may not be misled by them.

* See Chapter XII.

It is a mistake to say "filling materials have edge strength." Neither gold, amalgam nor cement has anything of the kind.

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It is a mistake to call "occlusal" cavities, "crown cavities." A "crown cavity" is the cavity occupied by the pulp. The pulp chamber is known as the "crown cavity."

It is a mistake to say "amalgam preserves teeth better at the cervical (gingival) margin than gold." It does not, never did, never will. Of this I will speak again.

It is a mistake to say "strain of mastication;" "stress" is the word that should have been used.

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It is a mistake ever to "put amalgam in the six anterior teeth," for the simple reason that other filling materials are better.

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It is a mistake to suggest that "amalgam fillings in incisors need not be thicker than an ordinary visiting card," for this reason; a card of this nature is but three-tenths millimeters thick. How long would an amalgam filling of that thickness withstand the stress that would be met? The highest recorded pressure that these teeth have given is 260 lbs. (Black.)

It is a mistake "to wind the silk ligature round and round the tooth and matrix" (see Fig. 259), for the reason that one cannot make contour fillings that will be self-cleansing by that method. The matrix cannot be forced far enough away from the tooth so that the filling will not be flat at the middle third. Take two marbles, place them together, study their relation to each other, and you can see at a glance, when this shape is applied to contour fillings, how ideal it is. (Black.)

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This is, however, a most excellent method to use where amalgam fillings are to be made in proximal cavities where there is not an adjoining tooth, and for disto-occlusal cavities in the third molars.

It is a mistake ever to use "soft cement" for any other purpose than capping pulps; more on this topic later.

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It is also a mistake ever "to fill at once" on any kind of cement. Give it twenty-four or forty-eight hours to harden. You will thus know what you are doing and obtain better results in the end.

It is a mistake "to leave the matrix *in situ* until amalgam has set." If proximal cavities are to be filled with an amalgam, use a quick-setting alloy. By the time you have the cavity filled the amalgam will be hardened sufficiently to remove the matrix at once. Better work and better results are obtainable by this method and you are saved seeing the patient

a second time the same day. The patient is also saved the trouble of returning to have the matrix removed.

It is a mistake "to leave frail walls" anywhere.
Page 264. What is a frail wall? It is a wall of enamel unsupported by dentine. On what does enamel depend for its support? On the dentine. These are my own answers. I think them correct. I should, therefore, say: "Remove all frail walls or they will be removed for you by the stress of mastication."

It is a mistake to say "Cement strengthens frail walls." This is simply impossible, for the reason that cement in itself has no elements of elasticity. It does not compare in any way with dentine; on the contrary, it is just the reverse from it; a brittle substance. This being a fact, how can it "strengthen frail walls?"

It is a mistake to speak of "teeth of low grade structure." We know these old theories have been exploded by the careful experiments of Dr. Black. Dr. Clapp may not accept them, but the progressive men of the profession have done so.

It is a mistake to fill mesio-occlusal cavities in upper first molars with amalgam, if gold can be used: for the reason that gold is, in the vast majority of cases, the best filling material to be used. The difference in the cost of materials (gold and alloy) is too small to be taken into consideration. The making of an amalgam filling involves much more labor than the making of a gold filling, and it is a kind of labor not to be sneered at, for it must be careful and painstaking. It is much more trying on nerves and muscles than the labor of making gold fillings, for the simple reason that in one case you know what you are doing, and in the other you only think you do. Moreover, in the end, which result is the better—the one obtained by using gold, or the other?

It is a mistake to "pack gold on soft amalgam,"
Page 267. for the reason that "soft amalgam" should never be used for filling teeth, as has been shown by past experience. Reasons for not using this method have been given by other writers. If an amalgam filling is to have a gold veneer, a more satisfactory operation (for patient and operator) is made where the cavity is completely filled with amalgam. After several days, polish the amalgam. Then cut away the amalgam to any extent desired and finish with gold. And yet who has not polished an amalgam filling on a proximal surface, twenty-four hours after making it, and then, on examining it again a little later, found it necessary to repolish it? In view of this is this method to be considered a safe one to follow? I think not.

It is a mistake to say, "Almost no tooth substance need be cut away *simply to get access.*" This is wrong, for the reason that decay cannot be removed as it should be without a proper Convenience Form. Nor can any progressive dentist ignore the Marginal Form, to say nothing of the Retentive Form. To suggest the preparation of a cavity, on these lines, ignoring entirely the five forms for cavity preparation, viz.:

The Outline Form, the Resistance Form, the Retentive Form, the Convenience Form and the Marginal Form, (Black) and all that has been said of and for "extension for prevention" by the able writers of long ago, is wrong. Dr. Clapp and every intelligent man in the profession knows it. No such statement should be permitted in a text-book of dentistry in this last half of the last decade of the nineteenth century.

It is not a mistake to say "cements last much better when put in with considerable pressure." (Par. II, Page 272.) It would have been better perhaps to say, "Some cement fillings that are packed into cavities with much force are stronger and their lasting qualities are much better than those merely pressed in with a burnisher."

Dr. Clapp merely reiterates what Dr. Fernandez of Chicago alleged to be true, years ago. Why, with this knowledge, does he at any time speak of, suggest or advise the use of soft cement? It is an utter impossibility to pack soft cement with any force. The only place in operative dentistry where it should be used is for capping pulps. If, as is alleged, the cement is used for a foundation, does it not seem reasonable to suppose that that should be as strong as it is possible to make it? Where buildings are to be erected, or bridges to be built, is not the engineer most particular about the cement that goes into the foundations? If he were not, the inevitable result must follow: the building or bridge would fall. There are too many dentists at present erecting four-story houses on one-story foundations.

It is a mistake to advise the use of "an oiled burnisher" on cement fillings "at just the right degree of hardness," for this reason; as you burnish on one side you draw away the cement from the opposite margin. Cement fillings are supposed to be the easiest of all to make, but there is not a filling material in use about which so little is known, and with which it is so difficult to make a perfect filling. Those who question this statement need but make a few cement fillings in extracted teeth or a cavity in an ivory slab and examine the same with a microscope—the one-inch glass will answer.

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(Illustration 274.) It is a mistake to fill cavities that have "neither pits nor undercuts," but whose walls flare from a flat bottom. Where the walls of a

cavity flare from the axial wall to the margins and there is no provision made for the retention of the filling material, the endurance of that filling is but a question of a short time. No such cavities should either be made or filled.

Recently I have observed a considerable number of cement fillings that were loose and in some cases rolling in their cavities. In all cases the patients had been young operators fresh from college "Who ought to know." Inquiry among some of them developed this condition of affairs: "Well, Prof. Blank said cements stick to tooth substance and did not need any undercuts to hold them in." They will know better by and by. If cement fillings roll out in this way, what can be expected of metal ones?

(Paragraph III.) It is a very great mistake to
Page 276. advocate the "use of the matrix in making fillings of soft foil;" for this reason: All proximal fillings, when made with gold, should be built some distance beyond the margins of the cavity, so that the filling can be properly condensed. There is a second reason also, viz.: that the filling may be polished perfectly. It is not necessary for me to do more than call attention to these two points. Long articles on both subjects have been written in the past by others.

Danger Years ago I used the matrix but discarded it, because I found that there was a method far superior.
in If a gold filling is to be made in a proximal surface
Using Matrices. of a molar or bicuspid, and there is an adjoining tooth, if the matrix is placed around the tooth and tied (as illustrated on page 262), we shall have this result in the vast majority of cases: a poor contour that will be flat at the middle third. A filling of this kind is of no use in preserving the tooth. On the contrary, it will retain particles of food which will irritate the gum septum and later, the periodontal membrane. If the adjoining tooth is not decayed, it will be the means of rendering great assistance to the micro-organisms by keeping them in place until decay does take place.

"The interdental space must be properly contoured, where proximal fillings are made." So says our wise teacher, Dr. Black. There may be here and there an unusually able operative dentist who can make gold fillings with the matrix *in situ*, that will conform to those principles which we are teaching in the West, but, for the great mass of men, this will not be the case. They do not make these fillings as they should be made, nor will they ever do so if they continue to use a matrix.

Amalgam and the matrix are the best of friends. Do not separate them. They belong together. Those that may be interested further in

the matrix should refer to pages 539 and 954, *Cosmos* of 1891. (Black, Ottolengui.)

Not quite two years ago, I had the pleasure of attending a large clinic where several dentists of national reputation were to make fillings of different kinds. I was most desirous of witnessing the work of the dean of one of our large colleges, who was to fill a disto-occlusal cavity in an upper bicuspid. At nine o'clock the patient was seated and the work began. The cavity was prepared along the lines that are known as scientific. After the preparation was completed, a matrix was placed around the tooth and the packing of gold commenced. At two o'clock, some one kindly offered to dress down the filling, as the operator was almost exhausted by his labor. This was less than two years ago. Recently I had the opportunity of examining this filling, and found not only gingival decay, but buccal and lingual as well. Could anyone have witnessed this entire operation and noted the careful and painstaking efforts made by the operator to have everything precisely as it should be, and then, after eighteen months, see this filling, I feel he would have little use for his matrix in future when gold fillings were to be made.

This matrix hindered this man from working rapidly. He was so handicapped by it that he could not make tight margins. Think of taking five hours to make a filling of this kind and then having it to do over again within eighteen months! I have stood beside the chair in Dr. Black's office, and have seen him make many fillings of this kind without using the matrix, when the time taken for preparation, packing the gold and finishing the filling did not exceed ninety minutes. And the fillings he made, when completed, were as perfect as human ingenuity could make them.

**Tin and Gold in
Combination.**

In a chapter devoted to combination fillings in this text-book, I think it was a grave mistake not to discuss combination fillings made partly of tin and finished with gold. If a cavity is partly filled with Robinson's metal (fibrous tin), gold can be added at almost any place. I made some fillings of this kind nearly fifteen years ago and they are still doing good service. You can depend on the tin's staying just where you place it, but you cannot, at the present time, depend on the ordinary amalgams, which are in general use, for anything. We are fast approaching a settlement of this amalgam question and we shall shortly know much more about it. Then we can write with a definite degree of intelligence on the subject of combination fillings where amalgam and gold are to be combined.

Much more could be written upon the mistakes of this chapter. I have confined myself to a few only. I hold firmly to one thing and that

is, that *anything that tends to lower the standard of dentistry is a grave mistake*. I feel that "combination fillings" as advocated in this chapter are a mistake. Such teaching leads to lowering the standard.

**Amalgam
Combined with
Cement.**

Men tell us it is easy to place cement into cavities and then pack amalgam upon and into it. I have made some experimental fillings of this kind in the cavity block. The cavities were not filled three-quarters full of soft cement, but about one-quarter. After the first piece of amalgam was crowded into the soft cement, the margins were most carefully cleaned, all excess amalgam and cement was removed and the packing of amalgam proceeded with, as has been suggested in this chapter. These fillings have been examined by twenty or twenty-five dentists who have, without exception, pronounced them perfect. And they are so, as far as one can judge from appearances. But examine them with the one-inch power in the microscope and you have their true condition revealed. And what is it? Margins of cement. These fillings have been used to instruct those employing this method who have visited me. As each has seen the condition of these fillings, what verdict has been rendered? Only one—"That settles that method." We cannot use a microscope in the mouth to observe how we leave fillings made by this or any other method—would that we could, we should learn much.

**Combination
Fillings.**

Combination fillings are not of recent date, and, as they are set forth in this book, do not constitute an improvement upon the present methods. I do not at this time recall any of the few operations I have made where tin and gold or gold and amalgam were used, in which I could not have proceeded by other means. I am willing to acknowledge, however, that occasionally, perhaps once or twice a year, an operation involving a combination filling may be taken into consideration, but I do not think anything is gained by using this method. The farther we depart from the gold standard, the greater our loss in skill. I agree with one of our foremost men when he says: "If we never had any amalgam, if it had never been discovered, had never been used for filling teeth, more teeth would have been saved, for the simple reason that we would have men skilled in the use of gold. Amalgam fillings are apparently easy to make, but, in reality, present more difficulties of manipulation than any of the other filling materials in use." I agree with this statement, but I use amalgam nevertheless, and so does the writer quoted. There is a place for it, but that place is not, nor ever will be, nor ever has been, in any tooth where gold could be packed successfully. Gold, inde-

pendent of any combination, saves teeth from recurrence of decay, if it is used as it should be.

Let us look up the history of combination fillings. Dr. N. W. Kingsley, in the *Cosmos* of 1881, page 429, says he has been using them for four or five years. Then we must commence at 1876 or 1877. There are many observing men who, I think, will say that they have tried this method within the past twenty years, just as I have. They have been mortified and chagrined beyond a doubt, as I have been on more than one occasion, to have patients return with decay beside and around the gingival margin of their fillings. Dr. Kingsley says, regarding the usefulness of this method in preventing future recurrence of decay: "I have never seen a single instance where there has been any recurrence of decay at the cervical edge of the cavity." But he only advocated this method for "large cavities on approximal surfaces of bicuspid and molars;" and then only when his patients objected to an all amalgam filling. The cavities were "large." Do we, as a rule, see recurrence of decay around the margins of those proximal cavities which we consider "large?" Very seldom. Noting this some time ago, I advocated making all proximal cavities when there were adjoining teeth, two-thirds as broad linguobuccally as the teeth were thick in that direction. I had other reasons also and incorporated them in the article published in the *Cosmos* of December, 1897.

**Caries Recurring
Adjacent
to Fillings.**

For some time I have made a record of and placed in a separate box every filling that it has been found necessary to remove. So far as possible I obtain from the patient a history of the operation, etc. All this is entered upon the record kept for that purpose. The box is numbered to correspond with the record. I have now some 350 of these fillings and their records. When, therefore, I say that I can show any number of gold fillings with amalgam and gold and tin "cervical borders" that had linguo-gingival or bucco-gingival cavities of decay, I speak of what I know. The size of these fillings can be compared with the size of the newly formed cavities made in the teeth, of which a careful record is kept. Only a short time ago I found a large linguo-gingival cavity of decay beside a gold filling (in the disto-occlusal surface of a lower left first bicuspid), which I made for a young lady twelve years ago. The gingival portion of this filling was made of gold and tin, yet there was a recurrence of decay and a large cavity of decay beside the filling. Now it may be said this would have decayed years ago had not the gold and tin occupied that part of the cavity.

The fact that it decayed, that there was recurrence of decay, is all sufficient, whether it took place in one year or in ten years. There is in

my collection a large number of amalgam fillings that had great cavities of decay around and beside their "cervical borders." Only recently, I started another record which will give the size of these cavities where decay has recurred along the cervical border. I have a few records now, but if published would not be understood. At the present time I am making some fillings for a gentleman which illustrates how fallacious are the statements of Dr. Clapp. Besides other work on his teeth, are two cavities to be refilled, that now have amalgam fillings in them, a mesio-occlusal in an upper left second molar and a disto-occlusal in the upper left first molar. These fillings were made by one of our best operators, a man I know well. He is most conscientious in his endeavors to do the very best for his patients. One of the fillings is loose and the other has a large bucco-gingival cavity of decay beside the gingival margin. Now these fillings have been made less than five years. What is the trouble? The linguo-buccal thickness of these teeth is about ten millimeters, and unfortunately the cavities were made but three millimeters broad in that direction. This patient is a very uncommon man; he is the most excessive cigar smoker that I know. In the six years I have known him, I have never seen him without a cigar. There is not a very great tendency to decay in his teeth. The conditions for thorough work are very good. Yet here we have recurrence of decay about the "cervical borders" of amalgam fillings. These cavities will be prepared along different lines and the liability to recurrence of decay reduced to the minimum.

Let us look at this matter squarely, and ask two questions: What is the principal reason for advocating amalgam, gold and tin, or tin at the gingival margins of all gold fillings? What has it for a foundation? If the reasons given by one or two hundred dentists are to be believed, it is this: It prevents (sic) a recurrence of decay about the "cervical margins" of the fillings.

I say this is disproved by the fact that recurrence of decay *does* take place just as readily around fillings that have "cervical borders" of these materials as when gold is used. Just so long as men will persist in making proximal cavities only three millimeters broad linguo-buccally, in teeth that are ten millimeters thick in that direction, just so long will there be recurrence of decay, and it does not make any difference—none whatever—with what material these cavities are filled. Gold will do just as good service as amalgam or any other material.

In the past, before attention was called to the necessity for broader cutting, linguo-buccally, of all proximal cavities, we were all confronted with linguo-gingival or bucco-gingival cavities of decay around the margins of many proximal fillings, especially gold ones where tight margins

had not been made, and those principally that were in such positions that the margins of the fillings could not be kept clean. Now, what was the general practice? It was to *extend these cavities* and then fill with amalgam. (I am speaking principally of the fillings in bicuspid and molars.) The cavities had to be extended so that we could conveniently pack the filling material. Now what did that extension of the cavity margins accomplish? It brought the filling material into a zone where, in a majority of the cases, the margins of the cavity could be kept clean, either by hygienic means or by the excursions of the food polishing the cavity margins. There was not any further chance for a recurrence of decay where this was the case. It is a fact that where gold, gold and tin, tin or gutta percha were used in preference to amalgam in repairing these cases, these also preserved the cavity from further action of the micro-organisms. It was not the filling; it was simply because the margins of the cavity were extended into a self-cleansing zone. Now, I desire to ask: Is it right to give a filling material the credit for what correct principles of cavity preparation have done? Is it to such principles or to the filling material that we should give the credit? I say, it is wrong to base our practice upon the efficacy of filling materials, a principle, which experience has shown to be fallacious, rather than upon a foundation of correct principles of cavity preparation that are applicable to all filling materials. Yet this is the exact state of affairs that exists to day.

It is very astonishing to me, after all that has been written in regard to the absolute necessity of *linguo-buccal* extension for all proximal cavities, that we have statements like that appearing on page 268, par. I. I, for one, do not understand what retrogression of this kind means; nor how Dr. Clapp will explain it.

I cannot at this time go into particulars and criticise the illustrations of prepared and filled cavities. I refer in particular to Figs. 254, 255, 261, 265, 266, 267, 268, 269 and 271. These illustrated proximal cavities are all made smaller *linguo-bucco-gingivally* than *linguo-bucco* occlusally. This is wrong, for the reason that where recurrence of decay takes place in filled proximal cavities, it is at the *linguo-gingival* or the *bucco-gingival*; therefore, all these cavities should have been cut broader at these points.

Veneer Fillings over Cement.

In conclusion, I desire to say that among a certain class of operators there seems to be a tendency at the present time to place cement against all axial walls and afterward make a thin veneer filling of gold or amalgam over the cement. One writer in particular has devoted several articles to the benefits to be derived from this method. Among his sayings is this: "After the cement filling has been made, merely re-

duce it in size to what would equal the original thickness of the dentine that once covered that portion of the tooth." The cement has, therefore, been built out to equal the original size of the decayed dentine that was removed. Now, this is palpably wrong. Cavities that are to receive metal fillings of any kind should be most carefully prepared. Each of the five forms for cavity preparation should be studied with much care and applied to the case in hand, line upon line, precept upon precept. Stress must be studied. Amalgam fillings "the thickness of an ordinary visiting card" or "the thickness of the enamel that formerly enveloped that portion of the tooth" may answer where there is not an occluding tooth, or in the teeth of those who habitually bolt their food. But where these fillings are to receive any stress from the mastication of food, they will remain in their cavities too short a time ever to warrant placing them in position. I have within the past few months seen a few fractured amalgam fillings, which were failures because the fillings were not made thick enough occluso-pulpally. Now that the attention of the profession is called to this method, let us hope fewer operations of this kind will be made. A substantial seat for the filling to rest comfortably on, a broad step, and a secure anchorage, is, what is necessary for all proximal fillings.

There is a place for gold, for gold and tin, for tin, for amalgam, for gutta percha and for the cements; each has its own place as far as filling cavities in the human teeth is concerned. Use but do not abuse them.

Gold Not the Ideal Filling.

By NORMAN W. KINGSLEY, D.D.S., New York, N. Y.

Gold fillings in teeth are unsightly and savor only of barbaric splendor. It is the savage alone who would decorate his teeth with gold. Such conspicuous exhibitions of the jeweler's art violate esthetic taste and would not be tolerated by any refined person, were it not that in this country people have become so accustomed to these expositions, and with it possessed of the idea that in this way only can they have their teeth preserved, that they submit to that which would otherwise be grossly offensive.

It is bad enough when gold becomes a necessity for the preservation of the teeth from further decay, but when the employment of gold

is sought for purposes of display and to attract attention, it is an offense against all refinement and culture.

I once saw a passenger on board an Atlantic steamer dressed like a lady whose upper front teeth were nearly all gold. It was subsequently learned that she was of the demi-monde and used this means to attract attention. While small pieces of gold in teeth that are exposed to observation are unsightly enough, the introduction of entire gold crowns is an offense that only a savage would take pride in.

For several years I have been a personal observer of the investigations and experiments carried on by Dr. Jenkins, of Dresden, Germany, to obtain a material free from objectionable appearance. Dr. Jenkins, although one of the most skilful operators in the use of gold, was continually met with objections from his clients (who were among the most cultured of continental Europe), to his using gold, because of its unsightly appearance. These people would elect to have any other substance in preference, and would prefer to submit to constant repetitions of filling with gutta percha and cements rather than accept gold.

It was not therefore with a view of obtaining a cheaper material or one more easily worked, that Dr. Jenkins faithfully followed his ideal year after year.

His prosecution of this object was no empirical haphazard spasmodic effort. I have known him to leave an extensive practice in the care of his assistants and go into the mountains of Bohemia and spend weeks among the porcelain and glass workers for which Bohemia is famous.

He spared no expense; all the resources of scientific experts were at his command, and he was ultimately rewarded by the invention of a porcelain enamel which can be made to match the natural teeth in tone, texture and surface, so closely as to defy detection.

**The Ideal
Filling Material.**

I have been called many a time to inspect a mouth where he had inserted these porcelain fillings in teeth, and with close scrutiny have sometimes failed to detect them.

This material contains the ingredients and possesses the properties of both porcelain and enamel; it furnishes a perfect material for filling almost all cavities which are in condition to receive permanent treatment. It resists acids, is not stained by sulphides, is harder than the substance of which artificial teeth are made, does not change in color nor disintegrate in the mouth, and is perfectly tolerated in cavities which under gold would be continually sensitive to changes of temperature.

It is not a material for careless or incompetent operators, as its successful use requires the highest qualities of skill, taste and judgment.

Although only a limited number of American dentists in Europe have had an opportunity of putting this enamel to a practical test, each and every one is enthusiastic in its praise.

Dr. Abbot, of Berlin, says: "I consider the whole process, and the enamel body in particular, one of the greatest achievements in modern dentistry, especially from the esthetic standpoint. When properly and judiciously manipulated, this material enables the dentist to improve teeth, hitherto disfigured by gold or cement, to an almost incredible extent, by restoring contour, color, and by imitating the natural gloss to perfection. By its means, weak walls, which would ordinarily forbid the insertion of gold, may be sustained, and pulps nearly exposed and sensitive to thermal changes permanently protected. In short, besides the many uses to which the enamel may be put, in pivot and bridge work, and although its preparation would undoubtedly require some skill and conscientious care, the dentist may, in any case where a good impression can be obtained, perform with it an operation more than satisfactory to his patient as well as to himself. No dentist who cares to do artistic work and wishes to keep in the front ranks of his profession should be without this outfit."

Dr. Abbot's experience is confirmed by Dr. Sylvéster, dentist to His Imperial Majesty, the German Emperor; Dr. Miller, Professor in the University of Berlin; Professor Sachs, Breslau; Dr. Young, Leipsic; Dr. Thomas, Vienna; Dr. Davenport, London, and Dr. Crane, Paris.

Dr. Spalding, Paris, writes: "I have most surprising and delightful results from using Dr. Jenkins' porcelain enamel, and my patients are enthusiastic in praise of this process. It is to me one of the most useful and artistic adjuncts which has ever been offered to our profession, far outranking any other method of porcelain inlay or filling that has been devised. It will melt to a most beautiful edge, it can be contoured when desirable, it can be melted easily and is easily inspected during every stage of the process. This but feebly expresses my gratitude for so beautiful a help in my daily work."

And to the foregoing I unhesitatingly add from personal experience my endorsement of all the qualities as set forth.

Let no one be deluded with the idea that this is a cheap process for repairing decayed, broken or deformed teeth. It is more expensive than gold; requires more time, more judgment and more artistic skill than is required in the insertion of gold fillings, but to persons of refined tastes who are not seeking "cheap dentistry" the fee ought to be and is a secondary matter.

My Method of Using Amalgam.

By DR. A. L. OTT, Ridgeway, S. C.

Amalgam in the hands of a conscientious operator, beyond a reasonable doubt is second only to gold as a permanent filling material. But the practice of using amalgam in all cavities, deep or shallow, without an intermediate material is, in my opinion, a grave mistake. I have removed numbers of these fillings from deep cavities, and find either a diseased or dead pulp. When a patient applies for treatment where a handful of amalgam has been shoveled in, he invariably begins by saying, "I had this tooth filled and it has ached me ever since."

In some cases where gums are healthy, and the pulp atrophies, teeth so filled will be retained in the mouth for years with comparative comfort. But sooner or later where the amalgam is placed too near the pulp, trouble is sure to follow, bringing pulpitis, inflammation of the peridental membrane and abscess. By this practice many teeth are prematurely lost, thereby causing many to lose confidence in dental operations.

Many teeth are saved with amalgam that could not be filled with gold. Then why not use this grand ally of the dentist and friend of the poor in a scientific and workmanlike manner? To overcome the difficulties and objections enumerated above, in my opinion amalgam should never be placed over the pulp of a tooth without having the bottom of the cavity lined. Some use the oxyphosphates as a sub-stratum for amalgam, but the trouble with this material is that the phosphoric acid will destroy the vitality of the pulp in a deep cavity almost as quickly as the amalgam.

In deep cavities the best protection is a thin layer of chloro-percha. For shallow cavities I prefer a coating of shellac or sandarach varnish to coat cavities, using a layer of paper cut out to conform to the size of the cavity, placing this in the bottom over the pulp.

By using these precautions we eliminate almost entirely all danger from thermal shock, and if a filling has to be removed, the discoloration is not so great.

I do not claim these methods as original. I have only tried and found them eminently satisfactory both to myself and patients, and am sure the result will more than repay any who may give it a trial.

Having had so many cases where trouble had followed the insertion of large amalgam fillings, I am induced to report the method which has

given me such eminent satisfaction since I adopted it some four or five years ago. Slovenly work invariably brings bad results, and amalgam has had to bear more of the odium consequent upon faulty and reckless manipulation and lack of knowledge, than any other material we are called upon to use. Properly used, it will make a good record as a tooth saver. By deep cavities I do not mean those having exposed pulps.

The Best Way to Open a Tube of Pyrozone.

By FRANK H. FIELD, D.D.S., New Orleans, La.

Place the tube up to the neck in ice water, and let it remain until the paper label can be easily rubbed off, which remove. A large mouthed bottle should be kept clean and dry for this purpose. A hole is cut in the center of the cork stopper large enough for the end of the pyrozone tube to pass through, just far enough to allow the file to reach the neck where the directions tell us to file. The pyrozone tube as soon as it is removed from the ice water is dried and pushed into the cork, then the cork is put into the large bottle with pyrozone tube inside large bottle, and a sharp file is used. In this way I have had unfailing success. The cork prevents any jar or vibrations to the pyrozone tube, and there is no explosion that breaks it, as so frequently happens when only the wet towel is used. If the pyrozone tube should explode, the large bottle catches the fluid. The large bottle should be clean and dry, so that if the pyrozone tube breaks there will be no moisture to dilute the pyrozone.

Cast Aluminum.

By ORA A. KEISER, D.D.S., Bryan, Ohio.

In February issue of *ITEMS OF INTEREST* an article on cast aluminum by Dr. A. A. Powell, of Gas City, Ind., read as follows:

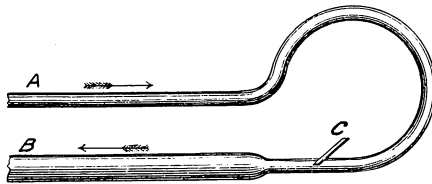
"Much credit is due the late Dr. Bean of Baltimore for the progress made in cast aluminum. His study and discoveries promised much. A score of years have passed since a Swiss avalanche carried with it his precious body, little advancement having been made since, the life of the work seemingly going out with his."

The life of the work has not gone out, but has been moving on to success. Dr. Willard Streetman, of Cleburne, Texas, has been working on cast aluminum until he has modernized and simplified the Bean process, and brought it up to date. He has completely overcome the difficulties of the lightness of the metal, (a) with regard to air in mold, (b) sharpness of casting. He has overcome the difficulty of contraction and shrinkage. He has invented a strong, simple and cheap apparatus for the work. The combination of his inventions and discoveries render the casting of aluminum plates more satisfactory to the dentist and patient than the manufacture of rubber plates, and thus renders practical the use of aluminum, which with all former appliances, while not impossible was at least so difficult as to disappoint and discourage its use. He has discovered a process of refining aluminum and preparing it for casting of dental plates, that renders it purer and denser and thus assures its durability in the mouth. He has mastered the difficulties and errors regarding the fit of plates and articulation and occlusion of teeth.

A Saliva Ejector.

By DR. JAMES L. BLISH, Fond du Lac, Wis.

Perhaps one of the most indispensable things in a dental office is a saliva ejector, and to those who do not care to invest in an expensive fountain cuspidor outfit, I would suggest the following inexpensive and efficient arrangement.



Of course it is necessary that there be a water system in the building, and the nearer the operating chair is to the wash bowl, the cheaper will be the ejector.

The supply pipe running to the wash bowl should be tapped with a small lead pipe (one inch), and this pipe, A, carried along the baseboard to a point opposite or convenient to the operating chair; then a loop is made, large enough so as not to choke the pipe in bending, and the

waste pipe, B, is attached, leading to the waste pipe under the wash bowl. The waste pipe, B, must be at least twice the size of the supply pipe, in order to get the suction. Then in the supply pipe, four or five inches from its attachment to the waste pipe, insert a brass tube, C, one-fourth inch in diameter, and at an angle pointing toward the waste pipe.

The water rushing through the pipe, A, past the tube, C, creates a Torricellian vacuum in C, and by attaching a sufficient length of light rubber tubing at C, and a bent saliva tube at the other end, we have a very efficient saliva ejector which is always ready, and as the saliva is carried off in the waste pipe, there are no bottles to empty and cleanse.

A valve should be placed in the supply pipe at a convenient place for starting or stopping the stream. Any capable plumber can set in these pipes in two or three hours at a cost of from five to eight dollars.



INCIDENTS OF OFFICE PRACTICE

Two Interesting Cases.

By L. W. VARLEY, D.D.S., Pueblo, Col.

Case No. 1.

Case presented after two days of constant pain. Patient located trouble in left inferior first molar, which had been crowned about two years previously. Usual tests gave indication of trouble in that tooth. Second molar sound; normal color; no pain on percussion. Third molar visible above the line on photograph. Determined on removal of third molar, but all efforts in that direction were futile. The tooth was so loosened as to rock back and forth on its axis, but clung as a bar in sockets. Patient preferring



sacrifice of second molar to other operative procedure, that tooth was removed, and the source of trouble revealed. Through absorption a very prominent cusp of third molar had penetrated slightly beyond the pulp canal in root of second molar. The latter was abscessed, but there was no swelling or soreness on percussion.

Case No. 2.

I report the following case in belief that it will be of interest and in hope of an explanation of a phenomenon which I have never before observed.

Lady aged about thirty called to have right superior second bicuspid crowned. Tooth had abscessed twelve years previously and had been successfully treated by her family dentist. Patient remembered his calling her attention to medicaments passing through opening on gum. Determining on Logan crown, I excised the tooth, which was greatly dis-

colored by large amalgam fillings, and found the canal filled with cement. With round bur no larger than mouth of canal I followed the cement to a point about half the length of root, when the patient struck my hand away, declaring I had "struck the nerve." After washing and drying the canal I introduced explorer causing same pain on slightest pressure. Next introduced a fine Donaldson canal cleaner and removed minute pledget of cotton, perfectly clean and free from odor. Again introducing the cleanser very gently, the lightest touch of the needle point caused sharp pain and a slight flow of blood. Again the canal was washed out and dried; and from that time to the setting of the crown two days later, there was not a trace of blood or the slightest sensation in the canal.

Suspecting absorption, apical or lateral, I proceeded carefully with the fine cleaner and followed the canal fully a quarter of an inch further, but found the apical foramen closed, even to the finest point. Then proceeded to enlarge the canal sufficiently for Logan post, carrying the bur beyond the point of sensation and hemorrhage. This would seem to contraindicate absorption. I found no trace of fibrous tissue. The tooth had been perfectly comfortable since treatment twelve years previously. Two weeks have elapsed since setting the crown and patient reports absolute comfort.

Needless Extraction of Teeth.

By JAMES W. GRANT, D.D.S., Lancaster, Ky.

Some three years ago a light, bright, colored girl called to have the first right superior bicuspid extracted, saying that it had given her much pain.

On examination I found the tooth but slightly decayed, but the right inferior wisdom tooth was badly decayed and quite sore to the touch. I told her I thought that tooth was the cause of all the trouble. (All the other teeth were in place and perfectly sound.) I urged her to have it extracted then, but could not prevail on her to have it done. I advised her to have the bicuspid filled, and she consented. After a few weeks she returned still complaining of the bicuspid, and insisted so much that I reluctantly extracted it.

A few months later she came complaining of the second bicuspid very much, and prevailed on me to extract it, although sound.

After the expiration of more than a year she came again (a few days ago) complaining of the first right superior molar (a sound tooth).

Said it had pained her a long time. I told her it would be a shame to extract so good a tooth; that the wisdom tooth was the sole cause I believed, and I insisted on taking it out. My son (a physician who has an office with me), examined her mouth, and at our urgent solicitation she consented to have the wisdom tooth extracted. We told her if she still had trouble to call and I would extract the other tooth, but she has not returned.

Sciagraphs of the Teeth.

By DR. WILBUR S. ROSE, Schenectady.

The accompanying sciagraphs were taken for me without charge by the General Electric Company of this city, who thus evince commendable interest in the development of the scientific use of the X-ray.



FIG. 1.

FIG. 2.

FIG. 3.

Figs. 1 and 2 are from different sittings of a lady 25 years of age. She has just lost the deciduous lateral and the canine is partly absorbed. Where are the permanent teeth? Is there a possibility that in the dim and distant future the permanent lateral and cuspid may appear? On the opposite side of the mouth the deciduous lateral and cuspid are not yet absorbed at all.

Fig. 3 is of a young lady 15 years of age. On the opposite side of the mouth there is a missing lateral, the place of which is supplied by the fully erupted canine, no tooth being where the canine should be. The lateral in the picture is deciduous. Is the canine likely to erupt unaided?

The patient in the second case being but fifteen years of age, it is not impossible that the cuspid might erupt unaided, but it would be wisest

to remove the deciduous cuspid at once. In a similar case, the patient being just over fifteen, a sciagraph showing both cuspids deep in the jaw, the two deciduous cuspids were promptly extracted. One permanent cuspid erupted immediately and the other six months later. In the other case the sciagraphs do not include sufficient area for positive diagnosis. The laterals are probably absent, and the cuspids probably deeper in the jaw. See ITEMS OF INTEREST for 1897, p. 358-359.—Editor.

Mysterious Hemorrhages.

By ANTHONY A. FORMEL, D.D.S., Butte, Montana.

A very peculiar case came under my observation recently, and never having had such a case before, I report it hoping that some of my brother professionals will express an opinion.

A gentleman (Mr. B. Hopkins) came into my office bleeding very profusely from the mouth and complaining of pain at the angle of the lower jaw, left side; he also said he had a "piece of flesh" growing inside of his mouth. On examining his mouth, I found the oral cavity bathed in blood, which was oozing very freely between the first and second upper left molars, and from around the lower left wisdom tooth, which was only partly erupted, one-half (the posterior) still covered by an overlapping piece of gum, sore to the touch and somewhat swollen; on lifting this piece of gum I found that the blood would gush out violently.

The "piece of flesh," which he said was growing inside of his mouth, was nothing more than a clot of blood as large as the end of a finger adhering to the buccal side of the second left lower molar. I removed this clot, and made him wash his mouth with very hot water. He had been bleeding in this manner about 20 hours.

Under ordinary circumstances I would have amputated the piece of gum overlapping the wisdom tooth, but in this case I utilized it to hold in place a larger pledget of cotton saturated in a solution of Sub. Sulph. Iron, which I packed firmly under it, doing the same between the first and second upper left molars. I then made him wash his mouth thoroughly with very hot water, and within five minutes the bleeding had entirely stopped and the patient felt comfortable.

I can understand the possible and probable causes of the bleeding around the wisdom tooth, but I am at a loss to account for the bleeding between the upper left molars. The gentleman is 22 years of age, a barber by occupation, and always enjoyed excellent health. His habits

are temperate, and all his teeth are in a fair condition. I saw the patient again on the next day and there had been no recurrence of the trouble and he was feeling as well as ever except for a little soreness around the wisdom tooth. The pledgets of cotton had become loose during the night and were washed away in the morning while rinsing his mouth. I polished his teeth without trouble and dismissed him in the best of spirits.



Office and Laboratory

Office of Henry Arthur King, D.D.S., New York City.

The appointments of the reception room (Fig. 1) of the dentist of today should be particularly calculated to court forgetfulness, and selections of dainty bits of bric-a-brac, pleasing pictures, standard periodicals, piano, large comfortable chairs with nothing in sight suggestive of the operating room, makes waiting restful and not at all tiresome.



FIG. 1.

Our operating room (Fig. 2-3) is situated in rear of building and is 14 x 16 feet; a northwestern exposure gives light and air in profusion; two very necessary attributes. Floors are covered with inlaid linoleum in large carpet design, with borders to match; it is more easily cleaned and cooler than carpet, presenting a bright appearance every morning



FIG. 2.



FIG. 3.

after washing. Four large Oriental rugs are thrown over floor; windows have white dotted swiss sash curtains and white holland shades. A handsome silk screen is placed between chairs while operating. Our outfit consists of two Wilkerson chairs, Allen tables and brackets, engines, cataphoric cabinet and fountain cuspidors. In having floor connection put in, had it placed at rear of chair where water can be turned off or on with left foot without changing position when operating. There is a two-inch pipe attached to top of traps under floor and run through wall under window, to outside of building. This prevents



FIG. 4

cuspidors from becoming air bound, a very disagreeable feature when extracting, to have blood fill bowl and not run off; it will also keep a free circulation of fresh air through traps.

The cabinet between windows is of black ebonized wood striped in gold, doors containing nine small squares of glass set in metal and curtained in red figured china silk; the left half of cabinet contains cataphoric outfit, and on right side three shelves with bottles numbered and labeled for office use, all having ground glass stoppers. Two upper shelves are used for large cut glass bottles and two lower for water glasses. The cabinet was made to fit the space.

Two gas brackets with new incandescent lights at each chair was designed and made to order and are superior to any I have seen for use by a dentist. They can be extended from the wall five feet, placed in any position and retained there by thumbscrew. The light is very steady and powerful.

To the left of the secretary, carpenter and plumber have transformed a dark closet into an office laboratory. There is a bench and a drawer for waste plaster, filings, etc.

The laboratory (Fig. 4) is in basement under operating room. It is 14 x 18 feet, has yellow pine benches around three sides of room; plaster, gold and vulcanizing benches are covered with galvanized tin; hot and cold water and large galvanized iron sink with wooden slats at bottom

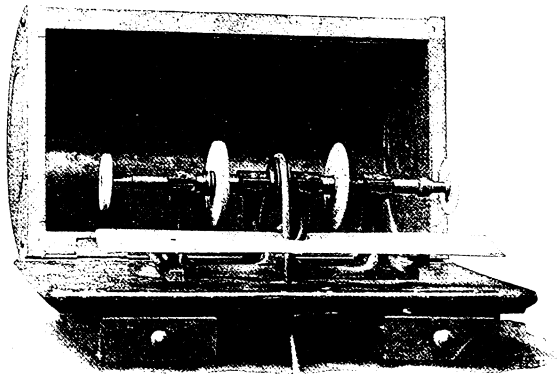


FIG. 5.

to prevent breaking; a marble slab 4 feet x 18 inches wide on plaster bench; also a large box on wall with tin spout to empty plaster directly in bowl for mixing; two grinding and one large polishing lathe; rolling mill and porcelain furnace; twelve attachments for gas and eight incandescent lamps with two large windows furnish good light. The cabinet between windows has twenty-eight pigeon holes and is used for impressions, bites and cases on articulators, where same is kept until ready for flasking, as no work is permitted to lie on benches. The benches are divided so as to give each assistant ample room to work. Speaking tubes, electric bells and small dumbwaiter communicate with office.

Fig. 5 is a dental lathe for rapid grinding, an invention of my own. It carries two or four stones at a time on steel spindle, which is ground perfectly smooth, runs in two bronze boxes, and can be adjusted to the greatest nicety by means of screws on spindles. Chucks for polishing wheels and brushes and stem-mounted disks and engine burs can be attached to either end of spindle.

SOCIETY PAPERS

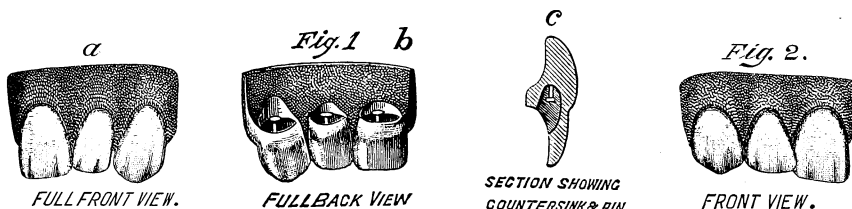
A New Sectional-Block Tooth.

By ALLISON R. LAWSHE, D.D.S., Trenton, N. J.

Read before the New Jersey State Dental Society, Asbury Park, N. J., July, 1898.

The constant aim of the prosthetic artist should be to perfectly imitate the natural organs and any improvement in means or material which brings him nearer the attainment of that aim is hailed with delight.

The countersunk-pin teeth are in form so far superior to the ordinary plain teeth that it has occurred to me we ought to have them with gum attachment as well as in their present state, forming countersunk-sectional-block teeth. This would make, in properly formed moulds, an ideal sectional-block. A front one is shown in Fig. 1 (*a* is a labial view; *b* a palatal, and *c* shows the countersinks).



A set of the present sectional-block teeth, when made from excellent moulds, fairly (I say fairly only because the bicusps and molars usually are much too small, and the cuspids too light in shade) imitate the natural organs on their labial and buccal aspects, but how sadly do they fail on the lingual and labial! With countersunk-blocks, however, we should have presented to the tongue lingual and palatal surfaces similar in form to those of the natural denture,—a desideratum which materially enhances the utility and comfort of the denture.

The chief faults to be found with block teeth as at present manufactured are the spaces filed between the anterior teeth, and the smallness of the bicusps and molars. Some time ago I ordered some blocks from a manufacturer with instructions to avoid sawing apart the anterior teeth, and the naturalness of appearance of the specimens sent me was

most pleasing. Fig. 2 shows one. It is the perfection of artistic arrangement.

One distinct advantage of the countersunk-pin teeth, as I have pointed out before (Dec. '97 *Cosmos*), is, the anterior and posterior teeth are made in different moulds so that bicuspid and molars of any size desired may be chosen to accompany the selected incisors and cuspids. Now if we might have countersunk-block teeth made on the same plan, without having the anterior teeth filed apart, and with the cuspids a shade or two darker than the other members of the set, we should come much nearer perfectly imitating the natural organs in our prosthetic work than we now do.

Experience with a Few Homeopathic Remedies in Dental Practice.

By WILLIAM I. WALLACE, M.D., Glens Falls, N. Y.

Read before the New Jersey State Dental Society, Asbury Park, N. J., July, 1898.

After a decade and more of medical practice circumstances led me to take up dentistry as well, and I determined to make use of my medical knowledge and experience whenever possible.

The teeth, though of a different structure from other tissues of the body, are still under the same general law of nutrition and growth. For that reason they are subject to the law of healing with those other tissues and organs, and the application of the law is only limited by the ability of the physician to select the appropriate remedy.

In dental practice use is made of tangible and material substances, as gold and the various metals, acids, salts, alkalies, etc., in their pure concentrated forms. In the use of medicines, and especially Homeopathic remedies, for the cure or relief of sickness and suffering we deal with the vital processes which are visible and only discernible by symptoms presented of change in the various parts and tissues of the body.

The point upon which emphasis is desired to be placed is, that while everything is being done in a mechanical way to combat the effect of caries and other forms of disease, and restore the teeth to their normal condition, assistance of a very practical nature can be rendered by the appropriate remedy. This is especially true in such conditions as neuralgia, ulcerations of the bony tissues, etc.

Aconite and iodine are known and used probably by all dentists for the relief of threatened inflammation of the nerve or pericementum, acting

as a counter-irritant. I have found aconite concentrated tincture applied in a cavity, where a paste of arsenic, carbolic acid and cocaine completely failed because of the excessive pain produced, to soothe in a few seconds, and after being sealed in for a few days to have devitalized the pulp, rendering the remaining treatment and operative procedures entirely painless and very satisfactory. This is because aconite is homeopathic to congested and hyperæsthetic conditions.

Of course great care must be exercised not to allow this powerful remedy to come in contact with the absorbent membrane of the mouth.

Neuralgia of the fifth nerve is caused by cooling too suddenly when warm and perspiring, or from exposure to cold air, such as riding against a strong north or northwest wind. A few doses of aconite the third potency about half an hour apart will relieve very promptly, producing a gentle perspiration. Such patients frequently come to the dentist thinking a decayed tooth may be the source of the trouble.

In the earlier stages of pulpitis, in fact as soon as you are liable to be consulted, complaint is made of throbbing and sharp pain in a carious tooth. The face will be flushed, pulse rapid and strong, eyes more bright than usual, and pupils dilated. A few doses of belladonna 3 will soon cause your patient to thank you for the speedy relief.

If the inflammation has been of longer duration and there is evidence of pus forming, yet extraction or evacuation is impracticable—a frequent experience in country locations—the tooth will be complained of as feeling too long; “it strikes its opponent before the others” and seems a little loose. Mercurius corr. subl. 30, a dose every hour until better, will prove far more satisfactory than any other aid you can render and the tooth may receive operative treatment at a future appointment with much less suffering. These cases get worse in the evening, having quite large cavities, and patients suffer agonies before midnight, yet experience little annoyance through the day.

Children are the greatest sufferers from toothache, probably because their teeth receive little care; also because of the excessive eating of sweetmeats. If you find them restless and fretful, only quiet when being held and petted, flatulent colic and diarrhœa in young children, chamomilla 30 will quiet them and enable you to gain their confidence. Of course this applies only to the aching from caries even if extensive, but not to pulpitis; in such belladonna should be used, sometimes in alternation with chamomilla.

Kreosotum. A remedy daily used in almost every dental office, and of great value, is beechwood creosote. Its virtues are known to all present. Perhaps all may not know of the beneficial effect of the homeopathic preparations as 12th or 30 potencies. A patient, probably a child or youth comes with cavities forming at the gingival line, the dentine wherever exposed excessively sensitive even to the explorer, showing acidity of the saliva. Also in the deciduous teeth of young children; sometimes a few months after they are erupted small cavities will form near the neck which soon will perforate and cut off the tooth; perhaps all of the incisors. In such cases kreosotum 30 will produce wonderfully satisfactory results. A case from practice will illustrate:

Charlie B., aged between three and four years, was brought in one day with superior incisors gone even with the gums, pulps putrescent, gums inflamed and purulent. The root canals were cleaned and thoroughly rinsed with calendula tincture, then temporarily packed with absorbent cotton, part of which was saturated with creosote, gently forced to apices of canals, the balance saturated with chloropercha. The child was crying and suffering severely, so I could not be as particular as with older persons. The dressings were changed once or twice at later visits, then the canals were filled with gutta percha. Kreosotum 200 was given internally for a few days after first call. He experienced no further trouble, the gums became smooth and healthy, and caries that had started in other teeth was arrested, which I think demonstrated that the internal use of the remedy had marked effect. I did not think extraction advisable if possible to save the roots, as the space should be preserved for the permanent set when they developed. Results prove my course correct, I think. An attack of neuralgia later caused by a cold yielded promptly to a few doses of chamomilla 30. No trouble has occurred since.

Caries Prevented
by
Internal Remedies. May I present a little theory at this point. You who were present at that inestimably valuable lecture by Dr. Williams before the Odontological Society of New York City will remember the illustrations and statement of the process of caries; how intertubular cement substance of the enamel was first attacked and dissolved, thus loosening a few of the enamel rods or disks. This process steadily continuing causes the cavities. The saliva which almost continually bathes the teeth is of an alkaline reaction in healthy persons normally. But ill health or fermentation from sweetmeats will change the reaction to acid, which quickly acts upon the cement substance, dissolving it, and in those who are in poor health, or showing this improper

condition of the saliva continuing for an indefinite time, the process of dissolution is more rapid and extensive. In such cases kreosotum, in the potencies, carried by the circulation to the salivary glands restores the normal reaction of the saliva, acting as a systemic antacid if you so choose to call it, and prevents the further destruction of the cement substance, thus preventing caries. To those who are unfamiliar with the theory of homeopathic potentizing may I state that the division of the molecules of remedies by that process renders their absorption more prompt and rapid—osmosis being the method—the finer the molecules the quicker it is accomplished. One more remedy should receive attention.

Silicea. Alveolar abscesses are a frequent source of annoyance to dentist and patient alike. Sometimes these cases will present a history of slow development, and be found very difficult to properly evacuate and heal up. The pus will be thin and watery. The patient will show signs of low vitality, cold extremities. Perhaps previous attacks have occurred and a fistula has formed with frequent recurrence of swelling and discharge of pus; ulceration of the alveolar process may be present. The usual treatment would be to open the gum, thoroughly expose the diseased surface if possible and scrape it, then apply antiseptics and cause healing by granulation. In these cases try a few doses of silicea 30 and only giving free vent to pus will be necessary.

Dentistry has made wonderful advances in the past quarter century, yet if we can prevent an abscess forming by giving a few doses of belladonna 6 as soon as it is discovered is it not better than the most skilful surgery? If a few doses of kreosotum 30 will prevent extensive caries, is not its administration better than large contour fillings to restore the destroyed tissue? Perhaps not for our pocketbooks, but certainly for the good of the patient.



An Effective Method of Treating Chronic Alveolar Abscess and Molars Having Pulp: Difficult to Extirpate.

By F. G. GREGORY, D.D.S., Newark, N. J.

Read before the New Jersey State Dental Society, Asbury Park, N. J., July, 1898.

During the past twelve years, in a number of cases, that would not respond to the ordinary methods of treatment, I have had recourse to a measure that has given my patients relief and myself the satisfaction of restoring to service teeth that were badly diseased. It is my purpose simply to give a practical paper on the method employed and not to enumerate the theories that have incited the practice. While a student (Oct. 1886) my preceptor honored me, by allowing me to witness every dental operation performed for a lady patient, about twenty-five years old, of extremely nervous temperament, having a variety of work done; among other disorders was an abscessed superior, right lateral, incisor, causing considerable pain. An attempt was made to cleanse the pulp canal and inject remedies into the affected parts, without success, as the canal was tortuous and could not be reamed out. After several ineffectual attempts were made to relieve the trouble, in agony, the patient demanded the extraction of the tooth. Somewhat startled, not so much by the request, as the tone employed in delivering it, I whispered to the doctor, "If she is willing to lose the tooth, why not see if you can get her consent to the experiment of replantation?" This was readily agreed to and the patient was anesthetized, using nitrous oxide gas. The tooth was extracted very carefully, so as not to injure the pericementum and the end of the root dressed down about one-sixteenth of an inch; the root canal reamed out from both ends, the tooth immersed in a ten per cent. solution of carbolic acid and the alveolus irrigated with a similar solution. The root canal was filled with oxychloride of zinc, the patient again placed under the influence of nitrous oxide, and the tooth, grasped firmly in the same instrument used in the extraction was then thrust back into its former resting place and ligated with dental floss. The patient was seen at intervals of about two days for two weeks, when the ligatures were removed and the tooth found to be very firm and giving no further discomfort. The patient has since come under my personal care and less than a year ago I inserted a filling in it and found it doing excellent service; in every respect a good tooth. This is the history of my first case. I have since found it necessary to resort to replantation for a number of people, of various ages, and will cite two other cases.

Mrs. —, age about thirty-five, nervobilious temperament, presented herself for such dental work as was required. Besides other cavities was one in the second right superior molar situated in the posterior cervical part of the tooth with the third molar *in situ*, hugging the second molar closely. The cavity seemed insignificant and was prepared and filled with amalgam without apparent discomfort. Two weeks passed and the lady presented herself, reporting that she had not been able to rest for several nights owing to the intense pain in the right molar region and that she "Must have relief or she would go crazy." Having come from her country residence some miles distant she desired to make no more visits than might be absolutely necessary and wanted the tooth cured in one visit if possible. An attempt was made to remove the filling, but owing to the excruciating pain the patient would not submit. There being a complete denture I was unwilling that the tooth should be sacrificed and with much boldness declared my ability to give complete relief and retain the tooth, saying, "I should have to administer gas and perform a slight operation, while she was unconscious." The tooth was then removed, the pulp found to be badly congested, having been slightly encroached upon by the filling; with a bur the pulp chamber was freely opened and the root canals thoroughly cleansed and filled with chloro-percha. The cavity in the crown refilled with amalgam, and the tooth was then immersed in medetrina, full strength, for a few minutes, while the patient was told what had occurred. The socket in the alveolus was syringed with medetrina and the tooth immediately thrust back into position, using ordinary molar forceps. The patient was dismissed with instructions to use a mouth wash of listerine one part and water four parts, frequently for a few days. No ligature or splint was applied. After a lapse of six months the patient's husband informed me that it was the best tooth his wife had.

Case 1. Mrs. —, age thirty-eight, complained of pain and swelling in the right lower jaw. An examination revealed a badly abscessed right lateral incisor.

Having come to my residence late in the evening for relief, and as she expected to leave town the following morning, to be absent some time, I had her accompany me to my office, where I extracted the tooth, removed the sac from its apex, dressed the root slightly and forced it back into its socket. After having bathed both socket and tooth in a mild antiseptic the tooth was ligated and the patient dismissed with instructions to use a mouth wash for a few days and to remove the silk from the teeth after ten days. Three months later patient was seen and the tooth had become firm and comfortable, the swelling having gradually subsided after the operation.

In re-introducing this subject I am conscious of the fact that it is unpopular, but as Doctor Marshall says in the July, 1892, *Dental Practitioner*: "Teeth that are not amenable to treatment are thus saved and made useful." To insure success there are several points that seem essential: The patient must enjoy good health; should not be anæmic, tubercular or syphilitic and not far advanced in age; the parts must be kept aseptic and the replanted tooth retained in a fixed position until union is established. The selection of the antiseptic employed is of great importance—to quote Dr. Black (American System, Vol. I, page 986): "Any agent, which will depress life in the form of micro-organisms will also depress life as it exists in the animal cells." A mild antiseptic is therefore desirable. A preparation known as Glyco-Thymoline (Kress) used in various solutions has been giving good results for the past two years. The union established is a much disputed point. Dr. Sudduth (American System, Vol. II, page 378) holds: "Union may be established not only between the root and alveolar wall, but also between the nerves and vessels of the pulp and the main trunks of each providing the tooth is replanted immediately after extraction." A complete vital union. Others claim the union to be purely mechanical; simply a contraction of the alveolar walls.* When we remember that Dr. Younger unhesitatingly uses teeth eight years of age (World's Columbian Dental Congress Report, Vol. 2, page 555); and cares not if the pericementum be entirely absent, and gets satisfactory results, we can reasonably expect a tooth immediately replanted after extraction will give a good account of itself.

The Value of a Course in Technics as a Preliminary Training to Students.

By H. B. HOLMES, Class of 1900.

Read before the Students' Dental Club of the Louisville College of Dentistry.

As time in her unceasing flight moves on, and competition in every avenue of life increases, we are warned that we who would keep abreast with it must not only diligently improve every moment of it but also use it to the best possible advantage. In this day and age when every pro-

* Teeth extracted after having been replanted, appear to me as though they regained a union identical to that of pulpless teeth, that is, a re-attachment of the periosteum to the alveolar walls.

fession known to man is filled to overflowing only he who is willing to labor, and to labor earnestly and systematically need hope for success.

Well has the poet said:

"Make use of time, let not advantage slip;
Beauty within itself should not be wasted,
Fair flowers, that are not gather'd in their prime
Rot and consume themselves in little time."

We who for the past six months have been dubbed as "The Old Freshmen" are tonight buoyant in the thought that those trying days when we have had to endure the "snubs" and condescending glances of our more advanced Junior and Senior brethren are over. We have passed the first mile-stone on the road to our chosen profession. And our experiences during this year's work, the experiences of our compeers, in our institution of which we are to justly proud, has taught us as we have never before been taught the importance of a thorough preparation, for this our chosen work. And where can we better obtain this all-important preparation than in the Laboratory of Operative Technics. A thorough preliminary drill is necessary to successfully pursue any avocation in life. Contrast ours with any other occupation and is not he who is the most successful the one who has in the greatest degree received this fundamental training? Take for example, if you please, the President of any of our great railroad systems, did he not first commence in the shops? And through days of labor and days of pain was he not first carefully drilled in the fundamental principles of this all-important work? Having once mastered the ground-work and great underlying principles he advanced step by step, easily overcoming other difficulties until at last the goal was reached, and he had distanced his competitors, who unfortunately would not or could not receive and acquaint themselves with that invaluable fundamental training with which he had so thoroughly equipped himself. Just so it is in every avocation of life, and especially in ours. We must not despise this first year's work even though to us it may seem as "The days of small things." Diligently, patiently and carefully master the rudiments and the brighter will be the roses and the fewer the thorns that will grow along our pathway; especially if we continually carry with us and put into practice this all-important principle that, the success of all dental operations depends primarily upon thoroughness.

Operative Technics is generally understood to apply to that part of the instruction which is obtained by operations upon teeth out of the mouth. And as this practice exercises the mind and the eyes, and in-

creases the dexterity of the hand it must be allowed that its governing principles are the same as those of manual training. The truth of this assertion is demonstrated by the fact that during recent years technic work has been introduced into all our graded schools of larger cities. And why? Because the best teachers recognize that the child gains a much better understanding by seeing, handling and doing, than by merely hearing and memorizing. They recognize also that systematic training of the hands is not antagonistic to mental growth, but assists it.

As a result of this, Manual Training schools have been organized in our larger cities all over the United States and are accomplishing well the work for which they are intended. Dupont Manual Training School is today the pride of Louisville and students who are graduated from its precincts easily secure and maintain some of the most responsible and lucrative positions. We are told that one young man who went forth from this institution was given a responsible position in one of our neighboring cities, with a remuneration double that earned by the majority of the youths of the age. Finding him so thoroughly conversant with every detail of the business intrusted to him his employer on hearing of his determination to offer his services as a volunteer in the present war, advanced his salary rather than be without his most valuable assistance. This is only one case cited, where a thorough Manual drill has proven to be of the utmost help and benefit. These Manual Training Schools can be and are regarded as the grandest of Technic institutions. One of the strongest proofs of the value of Technics as a preliminary training is shown by the readiness with which they have been taken up by the various Dental Colleges and the universal praise they have received in each and every instance. The teaching of technics in dental colleges is analogous to the various systems of Manual Training, of which simultaneous training of the mind, the eye and the hand is the great underlying principle.

We have, it is said, two kinds of knowledge—what we know through our own experience, and what we know through the experience of others. What is told us is another's; it rests on a different basis from that which we have gained by our own experience. Is a man a machinist because he has learned the parts of the steam engine and can define axle, lever, plane and bolt? Should a man be called a dentist because he can name the teeth, bones, muscles and nerves, describe the making of amalgams, or detail the best method of filling a tooth? No, not even if he can rehearse all that his teacher has repeated to him. A purely mental acquirement is a theorem, and a theorem is ever a demonstrable proposition. Whether it may be proved is always a question until the act of doing removes the doubt. In the progress of knowledge, practice ever

precedes theory. That it is necessary for the dental student to possess more knowledge than can be gained from lectures and text books, of the form, structure and diseases of the teeth, of the properties of materials, and of the forms and uses of instruments, as well as dexterity in handling them before he be allowed to operate on patients, is now generally acknowledged. Dr. Black says: Students shall be taught the nature and physical qualities of the teeth upon which they are to operate, of the materials they are to use, and of the instruments by means of which they are to use them. In our course of Technics this is done by means of a series of object lessons, also by having the students handle teeth and study their forms and examine enamel and dentine, by cutting them with instruments; manipulate the material used for fillings, study and practice the use of instruments and learn the tests for perfect manipulation. The existence of so valuable a text book of dental anatomy as that of Prof. Black's has enabled us to extend our knowledge and is certainly a treasure in itself; but in the course of Operative Technics as it is taught by our most excellent Dr. Grant other things are to be taken in connection with it. Let us briefly consider a few of the things which render Operative Technics invaluable.

Take if you please our system of tooth-carving;
First. a man who has put thought on what he is doing and
Tooth-Carving. has not done this through compulsion, but from a desire for improvement is bound to have this impressed upon his mind in a manner that nothing else could possibly do. In this he gains a most accurate knowledge of the form and outline of the tooth under consideration; also of the length, depth and general contour of all developmental lines and the various ridges, fossæ and grooves. In this work as soon as he learns the location and general character of these different parts, he instantly applies his knowledge on the tooth that he is required to carve, thus making it doubly impressive.

Failures of fillings in living teeth can often be traced to improper or imperfect preparation of cavities, and on the other hand, the success in almost hopeless cases of decay in dead teeth (sic) is due to the simple fact that the tooth has been properly prepared. Admitting this, can we not at once see the value of having this taught in the Technic Laboratory, rather than let us experiment on a patient in the infirmary? We have heard practitioners who had not had the opportunity of technic instruction, say that when they had their first patient in the chair, they were at an utter loss to know what method of procedure to pursue. Such a man having never prepared a cavity outside of the mouth is unprepared to take the first steps in the operation at hand.

How embarrassing to the operator! How terrorizing to the patient! We hope to avoid these occurrences by the use of knowledge, which has been and will yet be taught in our Laboratory of Operative Technics. There we have been taught the classification of cavities based upon causes, location and form. Also the preparation according to principles governing in each class. Not only has this been taught us by the use of models, but we have ourselves demonstrated it by the preparation of cavities in natural teeth.

Third.
Pulp Treatment.

We have also demonstrated and had actual practice in conservative pulp treatment, including the protection and capping of exposed and nearly exposed pulp. Practical exercises are also given in applying the vital principles of the best methods of gaining entrance, removal of pulp, cleansing and preparing and filling the canals of not less than four teeth, selected so as to cover the various kinds, those easy and those difficult to cleanse and fill. In doing this actual work we can readily see that study and extreme carefulness should cover all the ground; the necessity of the work; the devitalization of pulps and their subsequent treatment; the cleansing and treatment of canals containing putrescent pulp are all explained and we learn to do, by doing. Invaluable practice is also given in the breaking down of enamel, opening cavities, establishing cavity boundaries, removing decay, etc. In this course we can see the value of being extremely thorough, which means careful attention to the little things; we also begin to realize that only he who is painstaking in details finally attains to the perfect work. Here we are also trained in the use of matrices and gain some practical knowledge in making and applying them. In this work we can see the reasons for using them, can more readily understand the various forms and principles governing them, and the dangers attending their use. These are only a few of the many benefits to be derived from a course of technics, but surely enough has been cited to prove their importance.

When we are admitted to practice, we shall certainly feel like extending to our patient our sympathies in advance, for we doubtless will make many errors that time and continued experience alone can remedy, but we should shudder to think what would have befallen them had we not had this opportunity of fitting ourselves for the work by a drill in technics. Recently many improvements have been made and many will be made in the near future. It is said to be very probable that in the next few years schools will be organized that will teach Operative Technics alone and where students will spend the entire scholastic year on this one branch. At the expiration of this term if creditable work has been done they will be admitted to the Junior year of any of our best

colleges; this doubtless would be a move in the right direction, for the field is broad and wide and a subject that we are obliged to rush over in a few days for want of more time, might well have had devoted to it the work of days and weeks. If dental colleges are forced into the four years' course, technics will doubtless occupy the class' attention for one entire term and many will be the advantages to be derived therefrom.

We are glad that ours has been the privilege of taking this limited course, and feel that we voice the sentiments of the class when we assert that through the untiring efforts of our most worthy demonstrator, our labors have not been in vain, and in the not far distant future we will reap the rewards of this most important feature of the year's work. We have heard a few students, a very few we are glad to say, speak disparagingly of this preliminary work; we feel sure this was said thoughtlessly and before they had rightly considered the innumerable advantages they would derive from it, but since we gain such untold benefit from the practical lessons here taught let us stand together in giving it its just dues in the line of the dental profession and all unite in singing her praises until Operative Technics shall occupy a more important place in every dental college in this the grandest of all republics. Our present system is good, but we can do much for its improvement by our united efforts.

Let us remember that in unity there is strength, and remembering this follow the advice once given by Robert Burns, when he said:

"Be Britain still to Britain true,
Among ourselves united!
For never but by British hands
Maun British wrangs be righted."

Patent Instruments but Not Methods.

By CLARENCE J. GRIEVES, D.D.S.

Read before the Association of Dental Surgeons of Baltimore, June, 1898.

In view of the amended Act to control "the issue of patented processes to dentists and physicians" now under consideration by the committees on patents in Congress, these thoughts are suggested.

Why should the dentist (of all professional men) live in a "patented atmosphere?" We are surrounded by patented appliances. Instruments, many filling materials and pain relieving agents are, if not patented, secretly prepared.

Necessarily this seems to be the case and may explain, partially, at least, the lack of laws governing things patented in the dental profession as quite in contrast with the more stringent rules applying in the medical profession.

For the dentist to take the high stand in regard to all patented appliances assumed by his fellow practitioner, the physician, would be all but suicidal to the best interests of the profession at the present time. We should retrograde a half century at least and commence again the difficult foundations so well laid for us by the untiring efforts of our predecessors.

But while necessarily bound to the use of many patented instruments, we can with great credit to ourselves and good to the profession dispense with the patented method or process. The dentist, from the fact that he has something for sale beyond his professional services, is drawn dangerously near that rather dim line termed "dental ethics."

Whether it be his time at so much per hour, or fillings, gold or otherwise, large or small; or dentures (crown, bridges or plates), he daily adds to the patient's debit account the fractional portions of his final bill, and becomes in a certain sense a manufacturer.

The dental profession of today is far in advance of the results demanded of it by the public. The fact remains, nevertheless, that there is less expected of the dental practitioner in actual tooth preservation than of the medical practitioner in the preservation of health. This is caused, no doubt, by the greater apparent ease with which the dental organs are replaced; the desire for health and life is so much stronger than the necessity for dental repair.

Notwithstanding the well-known axiom, "the health of the body is the health of its component parts," the public will, with comparative complacency, become edentulous rather than lose a finger; knowing full well that the dental organs may be replaced with a very fair substitute, while the finger if replaced is neither a thing of beauty nor a joy forever.

Even in these days of much culture and refinement it is surprising how many there are who look on the care of the mouth as a little thing; the decay of the dental organs being equivalent to their loss and replacement. On the contrary, the public demands of its medical attendant the most accurate knowledge possible; he is early impressed with his responsibilities and the necessity of knowing to the minutest detail what he is using in drugs and treatments, and he has carried this caution into the choice of his instruments.

In his environment, the dental practitioner, from the constant use of patented appliances and with a smaller burden of responsibility, comes to look with less dread on patented instruments, patented processes, and secret preparations.

Encouraged by the financial success of patented methods, he becomes in turn a patentee of one or more of his favorite methods. While we do not question proper protection (and the reasonable profits that accrue therefrom) of original ideas in instruments for the man who invents them, we do question the ethical status of the practitioner who secures letters patent on a formula or method of procedure in operations about the mouth and dental organs.

Many valuable instruments in the hands of the dentist today would never have been generally applied were it not for the protection afforded the originator by the patent office. This protection shields the manufacturer, and in making the application general, cheapens the instrument to the operator. It assures the patentee a fair profit and the operator, an instrument the better for having been patented. But it is also equally true that many valuable devices which the dental profession should have long since put to use, have been shelved, awaiting the sale of those on the market. Many appliances are also placed beyond the reach of the regular, every-day operator through the cupidity of the patentee in demanding unreasonable royalties of the manufacturer.

Leaving the discussion of instruments patented by members of the profession to those fitted to cope with the question, let us look at that more serious menace to the claim of the dentist as a professional man which is offered by the patented method.

The patented method or process is too restrictive in its application, too faulty in its results; in fact, entirely too narrow to command the attention of men who profess the culture sufficient to practice dentistry.

The operator who reduces his opportunities for original ideas in daily practice, to the following of certain patented methods with results guaranteed by the inventor, becomes, even if successful in practice, more restricted in thought than the method he practices.

After many expensive excursions into the realm of patented processes, we awaken to find ourselves dwarfed in originality and realize that not one nor twenty "rules of thumb" produce positive results upon the vital dental organs.

In this too frequent sanction of the patented method the dentist falls far below the high plane established in the community by the physician; thus the dentist fails in his efforts to reach the goal he has had in view for many years.

The proceedings in a State Dental Society as in a State Medical Society should be of a highly scientific and surgical character, given to research and the development of greater manipulative ability. As are these meetings, so are we in the eyes of our kindred professions and of the public. The average State meeting is in-

**Dental Societies
Used for
Advertising Purposes.**

deed sadly deficient when measured by this standard; many papers are presented which savor more of advertisement than an honest effort to enlighten. Frequently the writer passes slips showing the application of his method, instruments, etc., which his hearers are invited to buy of him or of his agents, after the reading of the paper and for the usual money consideration.

These gentlemen, occasionally of high standing, are dental salesmen, who recognizing the value of a dental convention as the best possible means of advertising their wares, are among the first to proffer the reading of a paper. It is amusing to see, in these meetings, able men, who for years have given their best methods freely for the good of all, listening to and discussing papers which carry rich royalties to their contributors in the method described or the instruments necessary. How long would these advertising gentlemen be tolerated in a soliciting call at your office? There is an excellent rule in operation in many of the scientific and railroad conventions, which allows no man to read a paper introducing or having for its main subject a patented method.

Such a rule would constitute a much needed reform in State Associations. It would allow much more time for the discussion of original papers and relegate the man with the advertisement for himself and his wares to the clinic and exhibit rooms.

As in the National, so in all State Associations, papers should be "censored" by a suitable Committee or Board created for that purpose.

If we, as a profession, desire further recognition and the confidence of the medical fraternity, we should individually be untiring in our efforts to discourage the use of these patented methods and thus lend a helping hand to the eradication of the abuse.

I cannot better close this paper than to quote the words of a prominent French orator in the troubled year of seventeen ninety-three. He said: "I do not accuse the King; I do not accuse the nation; I do not accuse the people; I accuse the situation."





New Jersey State Dental Association.

Twenty-Eighth Annual Meeting.

The 28th annual meeting of the New Jersey State Dental Society was held at Asbury Park, N. J., July 20, 21 and 22, 1898.

The president, Dr. J. L. Crater, of Orange, N. J., called the meeting to order.

The Rev. A. J. Miller, of Trinity Church, Asbury Park, N. J., offered prayer.

The president read his address, which follows:

President's Address.

It becomes my pleasure and duty to preside over this body, which today meets in convention, celebrating its twenty-eighth anniversary. While rejoicing over the past, and looking for new inspirations from this meeting for the future, we have great reason for thankfulness that we are permitted to meet with unbroken ranks.

It is earnestly hoped that every member will bear in mind that we are not here merely for pleasure, but that we have much work to do; and hope to leave this meeting aided and helped in many ways from what we shall see and hear.

Our new law which was passed last winter by our Legislature, and signed by our Governor, is as near perfect as we could hope to make it, and I hope our society will stand by it, and see that it is enforced to the full extent.

I take especial pride in calling attention to the fact that the National Dental Society meets in Omaha this summer, and hope our New Jersey Society will keep up its high record, and that the committee will bring us good reports.

Our Examining Board has always done excellent work, and we shall expect its high standard to be maintained in the future.

I would impress upon you the importance of increasing our membership. Our Committee on Membership should see that all worthy dentists practicing in the State should become members of the State Society. There is strength in numbers; we live in harmony with our members, and New Jersey comes to the front every time when anything can be done for the bettering of our profession.

This society stands second to none, with a host of friends and well wishers throughout the dental world, some of whom are present with us, and others detained by the obstacles of distance and time only.

It gives me pleasure to welcome so many members of our profession from sister States, who have met with us, and will give us the benefit of their experience in their work; we extend to them a cordial welcome, and invite them to participate in our discussions with perfect freedom. There is something in the friction of mind, which stimulates and leads to higher attainments.

The Secretary, Dr. Meeker, read a letter from Mr. Craig; it stated that owing to failing health and strength Mr. Craig was most reluctantly forced to relinquish the reporting of the Society's meetings.

I wrote a letter to Mr. Craig, and thanked him
Dr. Meeker. for his expression of good feelings towards us. I mentioned the fact that in 1875, when I was first elected Secretary, I secured his services, and that he had been with us ever since; I said I felt sorry to part with him. I hope there will be some recognition made of Mr. Craig's services to our Society for the past twenty-two years.

Dr. J. Allan Osmun, offered the following resolution, which on motion was regularly adopted:

Whereas, the members of the New Jersey State Dental Society learn with regret that Mr. D. W. Craig, who has for so many years reported the proceedings of this Association, is compelled by ill health to relinquish his office, therefore

Be it Resolved, That we wish to place on record our high appreciation of his services and to tender him our heartfelt sympathy; also to tender the hope that by rest and recreation his health may soon be restored.

At the afternoon session Dr. Allison R. Lawshe, of Trenton, N. J., presented his paper, and the following discussion ensued:

Discussion of Dr. Lawshe's Paper.

Dr. Register. I have been interested in this subject for a number of years. Ten or fifteen years ago one of my patients was losing her teeth from pyorrhea, and was very averse to wearing artificial teeth. I took her teeth out at that time and cut the crowns off, and, reaming them out on the inside, I mounted them on celluloid, which at that time was becoming popular. They were worn in the mouth for a number of years. The idea then suggested itself to me that if that could be done with natural teeth it could be done with artificial teeth, and I had the S. S. White Company turn out for me the first countersunk teeth that were made. At that time I also experimented a little with the block system, making them in a block, but I made them a little different from those presented with the paper today, in having the palatine surface as perfect as the labial surface, and arranging so as to conform in every way with continuous gum work. If we would use the countersunk style of teeth improved as Dr. Lawshe suggests, we would approach nature very much more than we do today.

I think the profession ought to suggest to the manufacturers what they should do in this particular, and not allow the manufacturers to force on the profession the artificial teeth that they are making at present. So many people now wear artificial teeth which do not suggest nature, that I think the profession should take this matter in hand and compel the manufacturers to make teeth of more natural appearance.

This paper opens up a large field for thought.

Dr. J. Allan Osmun. When we see people wearing artificial teeth it does not require that they should wear any sign to show it; they do that by simply opening the mouth. As has been said, it is a shame that we should be so hampered. The aim of the dental manufacturer today seems to be to produce a cheap rather than a good tooth; not one that approximates nature, but one that is low in price. If they would turn over a new leaf in that direction, we would be better equipped for our everyday practice. Many a man has been condemned who has done his level best; the teeth were fitted all right, but, oh Lord, how they looked! And it has not been the fault of the dentist, either. Now this is the fault of the dental profession, because they have not demanded, and insisted upon the manufacturers furnishing, the proper form of teeth and I think the time has come when the dental manufacturer instead of trying to produce cheap teeth should give us something that is satisfactory to us to use in our daily practice.

(On motion the paper of Dr. Lawshe was then passed).

Dr. Iredell then read the paper of William J. Wallace, M.D., of Glens Falls, N. Y., entitled: "Practical Experience with a few Homeopathic Remedies in Dental Practice."

Discussion of Dr. Wallace's Paper.

I have found that silicea in the thirtieth potency
Dr. H. S. Sutphen. is a very valuable assistant to us in chronic alveolar abscess, more particularly where there is a fistulous opening through the gums which seems to resist all our attempts at healing; given three times a day for three days, and then morning and evening for from one to three weeks, it will almost invariably heal the most stubborn case, provided of course the roots have been as thoroughly antiseptized as possible and the abscess track syringed out and made sweet and clean. I have in mind several cases which bothered me very considerably until I tried this treatment and it cured the abscesses and there has been no return. One of these cases is three years old. Up to the time of treatment the abscess had been in the mouth for ten years, almost constantly discharging; the teeth had been treated, the root canals had been filled, and well filled, too, with gutta percha and still the abscess had continued. Silicea, thirtieth potency, cured it.

I feel, as a great many of us do, that we ought
Dr. Gregory. not to deal with remedies that we are not thoroughly familiar with, and I do not think the dental practitioner can very safely prescribe these remedies; it is all very nice if everything works smoothly, but my experience has taught me a lesson which I will never forget. I had a patient who had an abscess of a few year's standing, for which I prescribed belladonna; the next day I learned that the services of a physician had been required during the night and that the patient had very closely approached death. It seems this patient was under the care of physicians who had dosed her with bromide, so we had a very bad case of belladonna poisoning. I should not have done it, and would not prescribe it again.

Dr. Osmun.

What was the dose?

Dr. Gregory.

It was of the third potency.

I do not feel competent to speak on this subject; the essayist has mentioned so many things I do not know anything about and so many things that I thought I knew something about and find I do not, according to his ideas. For instance, when he suggests belladonna for pulpitis in its primary stages and then corrosive sublimate for *pulpitis when the tooth gets long*. Why, I never heard of a tooth getting long in pulpitis; there are a number of other things in the paper where it seems to me the essayist

is shooting wide of the mark, or else we are not educated up to a position where we can comprehend homeopathy as presented. Dr. Gregory has suggested rather an important point. As I understand it dentists are registered and licensed to practice dentistry and not medicine, and the dentists, as I know, resent very sharply physicians encroaching upon their domains. If that is the case, why should not the physician resent the dentist's encroaching on his domains? As I understand the laws of the State we are not licensed to practice medicine, and if the matter is carried out as suggested in this paper, I fear somebody may get into trouble. It is all very well to know and suggest these things, but before you prescribe medicine, it is just as well to consult the physician in charge of the patient, or you may have an experience such as Dr. Gregory did with his belladonna.

This kind of paper is instructive and interesting, but at the same time I think we have but little to do with the subject unless we are fully equipped for the practice of medicine.

I would like to ask Dr. Brown if our law does
Dr. S. C. G. Watkins. not give us the privilege of prescribing medicine for dental troubles?

I doubt it; we have had one or two opinions on
Dr. Brown. that and the line is so close that it never can be settled until it goes to the Supreme Court. But I doubt very much if the Courts would uphold a dentist who administered medicine in the manner suggested in this paper.

I have heretofore expressed my views on the
Dr. Allan Osmon. subject of dentists' prescribing medicine, and I believe that Dr. Brown is right to a certain extent, although I think that a dentist should prescribe certain remedies and is legally guaranteed in his right to do so under certain conditions. The line of demarcation between the two is very, very closely drawn, but the point Dr. Brown made that we should not go into the domain of the practicing physician, is, I think, wisely taken. We have no right to prescribe remedies to be taken internally for neuralgia and diseases of that kind. I have always been a little suspicious of a case such as that prescribed for by Dr. Sutphen. If it has been of long standing, and I have prescribed any homeopathic or allopathic remedies, and it got well, I have always thought it was a mere coincidence. Some years ago I studied medicine quite thoroughly, and ever since I have been in dentistry I have been a student of medicine, and I am free to confess that I think a dentist is safer when he keeps within his domains, with instruments that dental men use in practical application, than he is when he goes over on the other side. I have not the slightest doubt that in the

belladonna case which Dr. Gregory reports, the patient took more than the dose recommended or took it more than once. I have prescribed tincture of gelseminum for neuralgia. I have prescribed sometimes 5 drops. However, it may be that there is a peculiar idiosyncrasy in a patient which a dentist cannot find out. I have known patients where one-fifth of a grain of morphine has had a very great effect upon them, and such cases can be multiplied by any one familiar with the use of the drug. I think we would do better to keep to our ordinary practice, and turn over all such cases as seem to require medicaments to the family physician, and in turn they will reciprocate and send us patients when there is trouble with the teeth.

I want to defend myself a little, and I think, the
Dr. Sutphen. profession as well. If I remember rightly, when I went to college we were given quite a course in medicine; and as I recollect if we attended one short session more we would have been graduated in medicine. I think if we keep up with our studies, we do get more or less of an idea of the general practice of medicine; we cannot fail to do so. At the same time I do not think that we are qualified, for it does not come within our province or vocation to prescribe for all the ills that human flesh is heir to. But I do say that when our patients come to us suffering with pain from a dental organ, we have a right, and it is our duty, to prescribe for those people. If we cannot do it by applications in the mouth or to the teeth, I think we should put remedies in the stomach to secure relief. For instance, if a patient comes to my office suffering from phthisis, I would not attempt to prescribe for him; if he comes with rheumatism I might think that tartar lithia tablets would do him good, but unless he should ask me what would relieve him temporarily I would not tell him. But if a man comes to me with a tender tooth at four o'clock or half past four or a quarter to five in the afternoon and I want to get out at five, and I am under the impression that if I do not do something for that man he will not sleep all night, and I think that by giving him ten or twenty or thirty grains of ammonol he would sleep comfortably until next morning I think it is my duty to do so and I do not think I am trespassing upon the domains of the physician. If I do that and he sleeps comfortably, I do not think that is a coincidence, I think it is the effect of the ammonol. If a person comes to me with an abscess of ten years standing, which has been treated several times without effect, and I treat it with silicea effectively, I do not consider that a coincidence, I consider that it is from the effect of silicea, and I do not think that I am transgressing the laws of medicine when I prescribe that internally. I do not think we should go at this blindly, and I do not think it is advisable for a young man, or an

old man either, to prescribe silicea in every case of abscess; I think the dentist should study the subject. Nor does that refer to this remedy alone, but to many other medicaments.

I do not know what the Supreme Court might think of it, but I know my friend, Dr. Chase from Princeton, can tell you the name of a gentleman who gave an opinion on that very subject and said to him: "If a patient comes to you for relief, and you do not do all that is in your power to relieve him, whether it be by local application or internal medicaments you are criminally liable."

I was not here Mr. President when the paper
Dr. W. G. Chase. was read, but I have listened to the discussion. I have had occasion to make inquiry with reference to the status of the dentist under the law on account of the paper which I read before the Tri-Union meeting in Baltimore, last June. I quoted from different authorities there, one of which was Judge Garrison of New Jersey, who says, that a dentist has the right to prescribe medicine for his patients in the line of his practice; but if they should come for treatment for any other disease, we have no right to administer medicine; if they come suffering from dental lesions we have the right to prescribe medicine to be taken by the alimentary canal or in any other way in which medicines are usually taken. If dentists have no right to prescribe medicine it throws the door open to criticism. What right has the State Board to examine a man as to his knowledge of medicine, if dentists cannot prescribe them? They should examine him only on his mechanical ability to fill a tooth or to make a plate. In the colleges we are taught medicine and therapeutics, as well as anatomy, physiology and kindred subjects, and our examining boards have a perfect right to examine on those subjects because they come within the knowledge of the dentist, and the better knowledge the dentist has of medicine the better able he will be to treat his patient, prescribe intelligently for him, and cure many diseases he would otherwise be unable to cure. We have here today a gentleman I had the privilege of sitting under and listening to his lectures on pathology and therapeutics, and I think he will uphold me. I think that it is necessary and right for every dentist to perfect himself, as far as he is able to, in that line, in order to help his patients and aid him in doing his duty.

Mr. President, I am rather sorry that my venerable friend Chase calls me to his aid in this matter, for my teachings, as far as I have been able to govern them, have been in the strictest and closest manner confined to dental therapeutics. I have indulged in systemic treatment, but I have constantly stated to the classes that in my opinion if there was any profes-

sion which was an utterly unreliable one, it was the profession of medicine, and that I did not like to teach them to fall back upon that profession for anything as far as they were concerned, and on the other hand, as far as my experience has gone, I think the nearer I have stuck to the dental role, the less trouble I have gotten into. I must disagree with my friend Sutphen, much as I dislike to do it. If a patient should come to me with neuralgia, which I thought came from some dental trouble, I should go at that dental trouble until I had performed to the end of my role, and then if I thought the patient needed further attention, I should send him to his family physician.

I find it very infrequent that we have to resort to systemic treatment in connection with our practice. I think the reason that we have occasionally to resort to such treatment, is because the dentist who is in charge of the case is not acquainted to the full extent with the dental possibilities in connection with it. I tell my boys "that the extent to which they are acquainted with dentistry is the extent to which they will succeed." I have always taught that the reason dentists give pain or fail to give relief to a patient in an operation is *not* because it is not possible to do otherwise, but because they do not know *how* to do better.

But as I have said, my idea is that the less one has to do outside of dentistry, the better dentist he is; when he goes into stomatology he is liable to get into trouble. In dentistry it is not so.

The *Cosmos* calls dentistry *the* profession; it says on the outside of the cover that it is devoted to the interests of "*the* profession," and to my idea there is no other profession or calling that can make a greater percentage of successes than dentistry. It is almost mathematical in its exactness. Therefore I am proud to have passed my life as a dentist; I am a dentist and for dentistry, first, last and all the time.

I am delighted to hear Dr. Flagg come out flat-footed and lay down good common sense, and I was a little bit startled to hear what our friend from Princeton said; it was particularly startling for me, who supposed I knew something about the teachings in the dental colleges, to be told they are teaching the practice of medicine in dental colleges. I am on the Examining Board and I examine on materia-medica, and therapeutics. I was also put on the Committee on Colleges in the National Association, and I never yet knew a college that pretended to teach the practice of medicine. Are we professors of medicine or not? If we are we have to study medicine first; if we do not study medicine first we are dentists, and what business have we to take the patient of a medical man whom he may be treating for some intricate disease, and prescribe

something which may not only undo the work the medical man is trying to accomplish, but perhaps jeopardize the life of the patient as well? I tell you, gentlemen, this highflown talk about examining boards being useless if they do not examine a man on the practice of medicine is all very pretty, but it is not dentistry. We are not put there to examine on medicine, and the sooner the dental profession understand the plane they are on, and do not try to get beyond it until they are ready to study medicine and make a specialty of it, the better it will be. Do not let us hold ourselves up to be medical practitioners when we are not. Dentistry occupies just as high a plane as that of medicine, and no man can stand higher than when he is practicing dentistry and strictly dentistry.

(On motion the paper was passed).

Dr. Frank G. Gregory, of Newark, N. J., then read a paper entitled: "An Effective Method of Treating Chronic Alveolar Abscess and Molars Having Exposed Pulpas Difficult to Extirpate."

Discussion of Dr. Gregory's Paper.

The subject of this paper seems to be one which **Dr. S. C. G. Watkins**, of late has not been popular with the profession, but I think there are many cases where replantation and implantation are certainly beneficial. I enjoyed the paper very much and was glad to learn that Dr. Gregory has been doing something in that direction. I have planted many teeth myself, and I remember well the first case of which I ever knew. About 1872 my brother was a student in my office; a patient came in to have a tooth extracted, and my brother saw him; it turned out to be a lower tooth and my brother thought it was a good opportunity for him to practice, and pulled, as he thought, the right tooth, but to his great consternation extracted the wrong one; he told the patient to be quiet, placed the tooth back in position and extracted the other one. I thought no more about it at the time, but two or three years ago I met a dentist who had done some work in that patient's mouth and the tooth was in position at that time. About eighteen years ago I extracted an upper first bicuspid, or a second, I am not sure which; there was an abscess and I extracted the tooth for the purpose of curing it quickly. I excised about a sixteenth of an inch from the end of the root, filled the canal with gutta percha, and replanted it. The tooth is there today in good condition and has been refilled since then. I have treated others in a similar manner and have had very much the same result. It is a practice which is worth trying

in severe cases, and the chances are, if it is done carefully, and antiseptics used which will destroy the bacteria, and not destroy the tissues, that the results will be favorable, with a healthy patient.

About two years ago I had a case which I was quite interested in. A patient presented herself with a badly decayed tooth which had been abscessed for a long time, and which had a fistulous opening in the gum, while the alveolar process was mostly absorbed. There was but a little piece of root badly broken down, which would not do to place a crown upon, so I extracted it and selected a good root to implant. I could not get a good tooth, so I chose a good root and put ox-phosphate filling in both of the cavities that were in the crown and implanted that after of course making the proper treatment. I allowed it to remain in position for four or five months when it became perfectly solid in the jaw, then I cut off the crown and put on a Logan crown and it is in place now doing good service. That was one case where implantation was certainly beneficial. It may only last four or five years, perhaps only two or three years, but even so, it will have served the patient very well.

I was very much interested in Dr. Gregory's **Dr. W. D. Cenisson.** paper, because I have performed that operation myself on certain occasions. The paper carried me back several years in my own practice, and that practice indorses some of the statements of his paper.

I had occasion in two or three cases to treat ulcerated teeth where I could not control the trouble and extracted them, cutting off the ends of the roots and replanting them; the operations were very successful. There is one case which comes to my mind particularly, which led me to think very favorably of the practice in some cases. About 1880 a patient came to me suffering from a superior lateral on the right side. There was a discharge from the palatine portion of the socket (the case was complicated on account of the man having specific disease); that portion of the socket was almost entirely destroyed. I treated that tooth for some time, but could not get any good results. I then proposed extracting it, which I did; after doing so I found an extremely hard substance on the root; so hard in fact that it required a file to get it off. I replanted that tooth using a chloride of zinc solution in the socket before replanting. The operation was very successful; the tooth became firm in the course of a few days and for eleven years did excellent service. At the end of that time it began to loosen and was lost a short time after.

I have performed that operation several times since and, so far as my experience goes, I consider it a proper operation in extreme cases, where you cannot treat a tooth in any other way.

On the question of whether nerve fibres connect. Dr. Watkins, in mentioning one of the cases under his charge said that his brother immediately thrust the tooth back in the same socket. In that case was there any treatment at all?

Dr. Leon Goble. No.

It seems to me that here is quite an important point, whether nerve fibres do connect and whether, on being replaced in that way, they do not take up the connection again?

I met with an accident of that kind myself. The alveolus had been decayed and one tooth had lapped over the other; in extracting a tooth with a very broad crown I unfortunately extracted the second bicuspid with it. I immediately put it back and the patient never had any trouble.

Dr. Register. I have had some experience both in implanting and replanting.

I was very much interested in Dr. Gregory's paper, but there are one or two points to which I take exception.

I think the operation of curing an abscess by means of extraction is certainly a radical one.

I do not believe for a moment that under any conditions a tooth can be removed, replaced, and the circulation in the pulp re-established. I think such a thing is absolutely impossible and that all cases of implanting are simply joints made under the same conditions exactly as you find in the process which is thrown out around a fracture by the bone.

I have never had a case that has gone beyond ten years and a fraction,—less than eleven years.

Invariably when they come out and are observed under a magnifying glass, they seem to present exactly the same conditions that a deciduous tooth does.

In reference to the other cases where a tooth is to be removed and the radical treatment of excising the root resorted to I would strongly recommend the use of a warm bath instead of a carbolic solution, and an endeavor to preserve the peridental membrane, rather than to have it destroyed. Cases where that has been successfully done instead of lasting only eight or ten years have continued for ten, fifteen and even twenty years; in fact I have heard of cases that have been in over thirty years, and which are doing service today. Teeth that have been extracted by accident and placed back in the jaw before removing the pulp and without sterilization, are in a state of devital *statuo quo*, and give no trouble

unless some poisonous influence as a germ culture be thrown into the putrescent matter of the pulp.

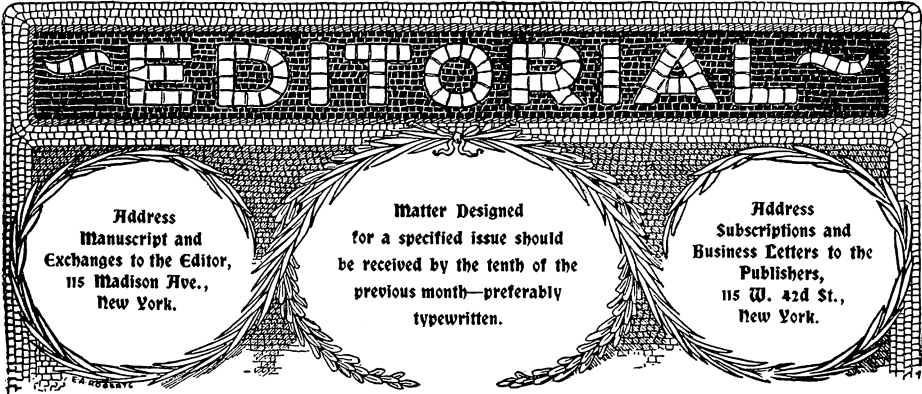
Dr. Osmun. I want to put myself on record as being opposed to such radical methods as have been suggested, unless they be absolutely necessary. The gentleman spoke of a case where a lady came to him with an upper molar tooth where he attempted to remove the filling, but because of the excruciating pain he administered an anesthetic, removed the tooth and afterwards put it back in place and it is all right today. It struck me that it would have been better practice, perhaps not in that particular case, but as a principle to lay down for young men to follow, to give the anesthetic just as he did and remove the filling; then he could have treated the tooth. I do not believe it is possible to tamper with any of Nature's work without having, as has been said here, "results." Nature is kind and indulgent, but the time always comes when we must pay for trifling with her. The history of all replanted teeth has been a limited length of life. I believe that almost every tooth can be properly filled and the abscess cured by the new methods which we now have, cleansing the roots with sulphuric acid or other adequate method. There have been cases perhaps in which the abscess could not be cured, but there are very few which cannot be cured without such radical treatment.

Dr. Gregory. Dr. Marshall is the authority for my statement of the idea concerning vital union.

In answer to Dr. Osmun I would say that I do not resort to such treatment until after everything else has failed. In the case that I have reported the circumstances were peculiar. The lady's husband had just gone through treatment at my hands and I had found it necessary to devitalize two of his pulps, and I was heartily condemned and was in a position where I felt I must do something to redeem myself. I did not care to put her right through the same course of treatment. As it was I made a lasting friend of her husband and he thought I had done the right thing for his wife.

I think a dental practitioner has a perfect right to perform any minor surgical operation involved in his treatment. I do not think that encroaches in any way on the surgical profession. I do not use the carbolic solution now; that is the only occasion when I used it.





Dr. Wedelstaedt's Criticisms.

In this issue we present an article by Dr. E. K. Wedelstaedt, in which he criticizes the chapter which Dr. Clapp contributed to the American Text-book of Operative Dentistry. These criticisms relate mainly to methods of practice, but also touch on terminology. It is this last feature of Dr. Wedelstaedt's article which offers an attractive field for discussion.

**Crown
versus
Occlusal.**

Dr. Wedelstaedt tells us that it is a mistake to call "occlusal cavities" "crown cavities," and he declares that the "pulp chamber is known as the crown cavity." This will be news to many.

Dr. Wedelstaedt is a disciple of Black, and it is from this source that he adopts this view; yet it is interesting to note that Dr. Black himself has merely suggested this use of the words, and evidently did not look for immediate acquiescence by the profession. In his "Descriptive Anatomy of the Teeth" (page 105), he says that "every tooth has a central cavity," and that this central cavity is divided into two portions, "known as the **PULP CHAMBER** (crown cavity) and

the **ROOT CANAL.**" It will be observed that he writes the familiar term "pulp chamber" in black face type, while the new phrase "crown cavity" is bracketed in small letters.

The profession must be thankful for the efforts of Dr. Black to lift our terminology from its chaotic state, and to render it more conformative with the language of general anatomy. It must also be confessed that his names for the various parts of human teeth are the most systematic and scientific that have been offered as a whole. Nevertheless, in some respects they are open to criticism. After all, one name is as good as another if comprehended by the majority; this from a purely utilitarian standpoint. The scientific systematist will think otherwise; but such men are ever hobbyists, and they should be prepared to find that others are not as eager as themselves to adopt their notions.

It seems improbable that the profession will accept "crown cavity" as a reasonable substitute for "pulp chamber." There are natural "cavities" in other parts of the human body, notably the antra, familiarly called "antral cavities." Analogously, *ab initio*, it might have been well to call the "pulp chamber," the "pulp cavity." But we are *in medias res*, and other arguments hold sway. The word "cavity" in dental literature has come to be associated with the depredations of decay; therefore, it is not wholly wise to utilize the word in this connection, especially as "chamber," the commonly accepted term, expresses the idea with equal clearness.

Next as to crown. Dr. Black suggests the word "occlusal" in its stead, for bicuspid and molars. It is highly probable that twenty years hence "occlusal" may have supplanted "crown," but it is a little early to chide a writer for using the older and better known term. If we consult our dictionary, what do we learn of this word? The definitions are instructive. If we consider the derivation we find that the dental mistake has been the application of the word to the whole of the erupted portion of the tooth, rather than merely to its top surface. If one consider the enamel alone, the term crown is applicable enough. But the verb indicates the act of placing some thing above another, as; "a circlet on the head," or "a house on a hill;" while the noun indicates the head gear or the top of the head, rather than the head itself. One or two quotations from the Standard Dictionary, will make this clearer.

Crown.

"The top or summit; as 'the crown of the hill.'

"The top of the head; as 'a bald crown.'

"Hence, the head itself; as 'Jack fell down and

broke his crown.'

" 'The upper portion of a hat.'

" 'The part of a tooth beyond the gum; especially the grinding surface of a molar.' "

Thus, however admirable Dr. Wedelstaedt may consider Dr. Black's terms, in this at least Dr. Clapp may well argue that the authority of Black to alter the derivative as well as the accepted meanings of words, cannot be allowed until sanctioned by the scientific body to which he appeals, through years of adoption of his ideas. It must be admitted, however, that when Dr. Clapp utilizes Dr. Black's term "occlusal cavity" on page 261, it *was* perhaps "a mistake" to say "crown cavity" on page 258.

**Strain
and
Stress.**

Next Dr. Wedelstaedt tells us it is a mistake to say "strain of mastication;" and that "stress" is the word that should have been used.

After consulting numerous works of reference in regard to these two words, the investigator will find his mind muddled, and unless he be well versed in mechanics and physics he may not in the end comprehend the nice distinction between them, especially as the different authorities do not give the same meanings to the words. The history of the words, or rather of the differentiation between them, is perhaps best given in the *Century*, where we find the following:

Stress.

"In mechanics an elastic force, whether in equilibrium with an external force or not; the force called into play by a strain.

"The word was introduced into mechanics by Rankine in 1855. In the following year Sir William Thomson used the word as synonymous with pressure, or an external force balanced by elastic forces. The terminology has been further confused by the use of Rankine's word strain by Thomson and others as a synonym for deformation. The words stress and strain are needed in the senses originally given to them by Rankine; while they both have familiar equivalents to which they

have been wrested. At present some writers use them one way and some in the other."

"In this paper the word strain will be used to denote a change of volume and figure constituting the deviation of a molecule of a solid from that condition which it preserves when free from the action of external forces; and the word stress will be used to denote the force or combination of forces which such a molecule exerts in tending to recover its free condition, and which for a state of equilibrium is equal and opposite to the combination of external forces applied to it. *Axes of Elasticity. Rankine.*"

"A stress is an equilibrating application of force to a body. It will be seen that I have deviated slightly from Mr. Rankine's definition of the word stress, as I have applied it to the direct action experienced by the body from the matter around it, and not as proposed by him to the elastic reaction of the body equal and opposite to that action. *Thomson. Phil. Trans.*"

Here we find an authority, Rankine suggesting definite meanings for these words in 1855, and Thomson, another authority, subverting them in 1856. For the purpose of our present consideration we may call attention to the fact that the Century (undoubtedly after due consideration of all authorities), adopts Rankine's definitions and in simple language declares that stress is "the force called into play by strain."

In the presence of this definition how shall we decide between Clapp and Wedelstaedt? The former speaks of the "strain of mastication," while the latter prefers the "stress of mastication," himself using exactly these words later in his article. But we find that there is neither strain nor stress of mastication. Both gentlemen are evidently confusing the words with pressure, (in which respect Wedelstaedt may fall back upon the definition of Thomson). It would seem that we would be more correct to say that "mastication may exert such pressure as to strain a filling, the stress resulting being great enough perhaps to shatter frail walls." Or simpler: "Pressure produces strain, which causes stress, which may fracture."

That this subject is not absolutely simple may be shown by referring to an article in Encyclopædia Britannica entitled, "Strength of Materials" (Vol. XXII., p. 594):

"Stress is the mutual action at the surface of contact between two bodies or two imaginary parts of a body whereby each of the two exerts a force upon the other; thus when a stone lies on the ground there is at the surface of contact a stress. * * * * Strain is a change of shape produced by stress."

Thus we find two leading authorities, one of which claims that strain produces stress, and the other that strain is produced by stress. But even if we adopt this latter definition, we do not come to the idea of simple pressure, as Dr. Wedelstaedt uses the term. Here, applying the words to dentistry, we would find that a filling being in contact with the walls and floor of a cavity, a state of stress would exist, which might result in straining (or finally in fracturing) a weak wall. But what relation the forces of mastication might bear towards fillings so situated brings us to complex mechanical and physical problems.

Finally let us discuss a term used by Dr. Wedelstaedt throughout his article. He makes several allusions to "proximal" cavities. As a disciple of Black, and a defender of Black's terms it seems odd that he has not followed Black, who alludes to these as "proximate" cavities. Other writers, in various works and papers tell us of "approximate" and "approximal" cavities. Surely they cannot all be correct. The definitions of these terms as found in the lexicons will be instructive and are herewith given:

Closely joined. In anatomy; used with reference to the contiguous surfaces of adjoining teeth.

Approximal. *Century.*

Close together. Said of the surfaces of teeth. *Standard.*

That which is next to; contiguous. In dentistry pertaining to contiguous surfaces, as approximal fillings. *Gould's Dictionary of Medicine.*

Approximate. Near in position; near to; close together. *Century.*

Near in position, time, or character. *Standard.*

Proximate. Next; immediate; without the intervention of a third. *Century.*

Lying or being in immediate relation with something else. Next; as a proximate cause. *Standard.*

Next. Immediate. *Proximate Cause*. The immediate cause of any change. *Proximate Principal*. Any substance whether simple or compound, chemically speaking, which exists under its own form in the animal solid or fluid, and which can be extracted by means which do not alter or destroy its chemical properties. *Gould's Dictionary of Medicine*.

Nearest; next; in anatomy; that end of a bone,
Proximal. limb or organ which is nearest the point of attachment or insertion. Opposed to distant or external.
Century.

Relatively nearer the central portion of the body or point of attachment; opposed to distal. *Standard*.

Situated at or nearest to the attached extremity of an appendage, thus, the proximal end of the arm is at the shoulder. Opposite to distal. *Gould's Dictionary of Medicine*.

What deductions shall we make from the above? First that Dr. Wedelstaedt's use of the term "proximal" is entirely unwarranted. It already has a definite and well understood meaning in anatomy. In dentistry we speak of mesial and distal, because we attribute position to the teeth in relation to the median line, the junction of the maxillæ. But in general anatomy the alternative terms are proximal and distal. Thus proximal should not be used to describe surfaces of the teeth, if we would be intelligible to other anatomists.

Proximate, while perhaps convertible to our purposes, is a bad choice because it has a definite meaning in chemistry, an allied science, while in common parlance it describes the intangible rather than the tangible, as, a proximate cause. Again it would seem more correct to speak of proximate cavities on one surface of one tooth, than to allude to proximate surfaces of two adjoining teeth, for we find that all the authorities agree that approximal is the anatomical term describing tooth surfaces. Moreover, this is the only definition given. Why coin or adapt another word?

The word approximate may better be reserved for use in describing diagnosis and prognosis, to which it would seem to be nearly always applicable.

The Editor's Corner.

Recently a large number of the dental profession met at the rooms of the Mexican Dental Manufacturing Company, in the City of Mexico, to

discuss the formation of a dental society. Speeches were made, chief among them being by Dr. C. A. Young, president of the above named company and editor of *La Revista Dental Mexicana*.

Mexican Dental Society Organized.

In brief Dr. Young stated that he had been requested to call this meeting by his brother professional men and propose plans for the formation of such a society, similar to those in the United States and Europe. He had consulted President Diaz on this subject and was informed by the president that the government would grant the same privileges to this society as enjoyed by those in other countries.

Many speeches were made and it was decided to call the organization the Mexican Dental Society. Gen. Porfirio Diaz was elected honorary president.

The following are the officers: President, Dr. R. Crombe; first vice-president, Dr. M. Carmona; second vice-president, Dr. J. Falero; treasurer, Dr. C. A. Young; first secretary, Dr. P. C. Hinojosa; second secretary, Dr. S. Sevilla; librarian, Alfredo Reguera. Trustees—Drs. R. Crombe, C. A. Young, Alf Theiss.

Professional Titles in Society.

Dr. G. E. Stallman, of San Francisco, Cal., sends the following and asks for an opinion thereon:

In the *San Francisco Call* appeared recently under the head of Answers to Correspondents the following on "Professional Titles": "A true professional gentleman, say a physician or a *doctor of dental surgery*, never allows himself to be introduced to a stranger in society by his profes-



sional title of doctor. It is only those who seek to advertise themselves in their profession who feel hurt if not introduced as doctor. If you desire to introduce a physician *professionally*, then it is proper to use the title *doctor*."

The author of the above luminous squib, quoted from the *Call*, is straining at a gnat and exhibits slight knowledge of ethics, professional or social. He is right when he says that only those who seek advertisement feel hurt if not introduced as doctor. Young men, to whom the title is new and a source of pride not unnaturally, and without wrong motive, delight to hear themselves called doctor—but even these, as well as older men to whose ears the word has grown stale, would be stupid indeed to feel hurt if the title be omitted. But the wise adviser of the *Call* readers renders himself ridiculous when he says that a true professional man "never allows himself to be introduced to a stranger" by his title. What course then does he pursue? If a friend commit this awful breach (?) shall the poor M.D. or D.D.S. turn to his new acquaintance and say: "My dear sir, I hope you will pardon my overzealous friend for informing you that I am a professional man. I am sorry that he should thus attempt to advertise my business. As he has made this *faux pas*, I beg of you to forget it, and should you need my services I should be indebted if you will apply elsewhere." The *reductio ad absurdum* method of argument seems to be the only one suitable in replying to the point raised by the *Call*.

Dr. H. B. Tileston, of Louisville, Ky., sends us the following:

**An
Error
Corrected.**

"In your August number you have credited me with the authorship of a paper which I did not write and an official position I did not occupy. Dr. John C. Blair is the author of the 'President's address,' to which by some (to me) unknown error, you have attached my name. Not wishing to rob Dr. Blair of the credit for his excellent address, I will ask you to make the proper correction in your next issue."

We gladly give place to this courteous disavowal of honor, and admit the mistake, which we trust Dr. Blair will pardon. We are inclined to believe that the fault was not altogether ours, but accusations do not seem to be in order so soon after vacation. Perhaps the vacation had something to do with it after all.

**New
Dental Law
in Italy.**

The following reached this office recently, and a copy of it has been sent to the Educational Section of the National Association, for appropriate action:

"Several weeks ago our Ambassador at Italy,

Gen. W. F. Draper, wrote me that the Italian government, some six months ago, issued a decree forbidding foreign dentists to continue practice there unless they had received Italian degrees. There is no Italian degree of dentistry, and the surgical degree which authorizes the practice of dentistry, requires a seven years course of study. The decree, therefore, if enforced, would stop the business of all the American dentists in Italy. The question now rests upon the comparative importance of an American dental degree or diploma, and the examination and course of study, etc., required to obtain it.

"I write to ask that you call the attention of some of your friends to this matter, and that answer be sent to the Embassy of the United States, Rome. I write you because I know you are interested in matters concerning our profession, even if a long way off. Truly yours,

GEO. P. COOKE.

Milford, Mass.

**Dentists
in State
Institutions.**

A correspondent, who sends the following, desires that his name be not published—consequently his address—and the name of the institution to which he alludes are also omitted:

"Articles in the late journals regarding dentists in the Army and Navy, reminded me of a crying need of dental services in certain State institutions. I refer more particularly to the insane asylums and especially to the State hospital at ——. My attention was called to this institution by a physician connected with it. The remarks were made in a casual conversation, but if they were half true the conditions would be a hundred times worse than they should be. He stated that a good many deaths were due directly to dental troubles.

"I do not know what dental service is furnished by the State. I believe there is one dentist, who goes for a day once a week, but judging from the above source of information his work can amount to almost nothing.

"My object in writing is to call your attention to this crying evil and to see if something cannot be done to relieve this unnecessary distress. I believe the State should furnish a dental as well as a medical staff to the public institutions, and especially to the insane asylums. The inmates of these institutions have enough to bear, and I believe that there can be no doubt but that many would be benefited mentally as well as physically by proper dental treatment."

This is as applicable to one State as to another, so that the communication is pertinent to us all. There seems to be more need of dental services in public institutions than in the army—the members of the lat-

ter, after all, not being on charity. It would seem especially needful that regular dental attendants should care for the inmates of asylums for the young. On one occasion, I paid a visit to a juvenile orphan asylum, and extracted temporary teeth for eighty-nine children. Nearly all of them had sixth year molars, decayed, which could have been saved, but which probably have been lost, as no dentist had ever offered his services before and perhaps none since. When a child's tooth aches so as to keep it, and *some attendant* awake one night, the sufferer is taken to a tooth extractor next day. In justice it must be recorded that some institutions do employ resident dentists.

**Dentists
Always Busy.**

Two tooth carpenters, each yearning for good works, met on the highway of a great city, and one forthwith said to the other, "Art thou busy?" Whereupon he that was accosted replied, "Yea, verily." The father of lies, who was likewise passing that way, smiled and said thus unto himself, "Even so with me," and readily joined himself to each of them; and all went their way together.—*Adapted from Medical Record.*

CORRESPONDENCE

Dr. Ottolengui:

Dear Sir—Your reply to my inquiry concerning donations to the Dental Museum, came on time, and in reply will say, I will send what I have about Sept. 1. Meantime will see if I can find something more.

Of the twelve or fourteen thousand dentists in this country, not less than five thousand *can*, if they *will try*, help to build up this museum. Let every one contribute something, no matter how small or inferior. Many will say, "what I can give will amount to nothing," but it will. Every malformed tooth, every impression from queer shaped jaws, will go to make up a big collection.

No museum in the world is made up wholly of works of art. We all should try to do something, that others may know we have lived; leave something tangible either in handiwork or discovery. We should all leave some light though it be feeble, twinkling in the outer court of fame. I saw in Europe a collection of old boots and shoes of all nations, running back three hundred years. One old boot would not have attracted attention, but so large a number became interesting.

Four years ago I could have contributed a fine lot of old instruments, that I have been gathering for thirty-five years. One was of very curious workmanship; on the handle was the name of John Greenwood. I also had some artificial teeth I found in Austria; eight came from bone—four in front and two bicuspid on each side, held in place by wood pins pressing against the natural teeth, all of which I lost by fire three years ago. So it goes. I am glad there is now a place to preserve such things.

I have six volumes of *Zahnarzte*, Adolf Petermann, Frankfort-on-Main, for the years 1877, '78, '79, '80, '81 and '85. It is a dental almanac with two very fine portraits on steel, and each volume bound in cloth, with the birth, death, etc., of those who have died in the several years. All in German. Yours cordially,

T. S. HITCHCOCK, Oswego, New York.

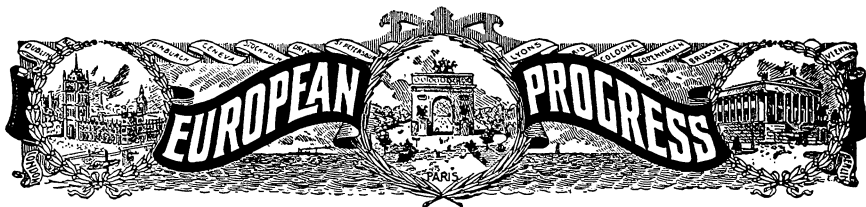
To the Editor:

Since Dr. W. L. Roberts has given us in the August number of *ITEMS OF INTEREST* a new formula for filling root canals, will he kindly give us the formula for *Balsamo del Deserto*. I believed it to be a secret preparation. Would it be scientific to give a formula, not knowing all the ingredients? The statement, "It is an exudation from one of the varieties of pine or fir trees," is not satisfactory. It was reported that Dr. W. H. White claimed he thought it the product of an insect. If he is correct, the insect is a *dandy*, to whatever species he belongs, and Dr. W. L. Roberts is in error. In the December number, 1896, *Dental Digest*, a formula, will be found, a substitute for "*Balsamo del Deserto*." As a non-conductor for metallic fillings, capping pulps, filling root canals, it is one of the best, always ready for use, not mussy if handled properly. It should be pumped in with a hot probe, nothing secret. The base is a balsam softened with oils and heat. There might be many other combinations with the base and the result the same. Yours truly,

S. DAVIS,

Denver, Colo.





On the Predisposing Causes of Caries. With Special Reference to the Investigations of Black and Williams.

A Lecture Delivered Before the Stomatological Section of the Royal Hungarian Society of Doctors in Buda Pesth, by A. Biro.

Translated for **ITEMS OF INTEREST** by Miss V. Dering.

The question of the etiology of dental caries has again been revived through the epoch-making investigations of Black. Since the fundamental work of Miller on this subject a certain stagnation of thought had set in because the conclusions arrived at by this investigator were so convincingly brought forward that the larger number of dentists regarded the question as, so to speak, settled. The investigations of Black and Williams have shown us that this is true as regards the immediate exciting cause of dental caries, but not so as regards the predisposing causes. In respect to these, the recent investigations have yielded very surprising results—results which, if they prove accurate will modify our views considerably. It is natural that such weighty statements which upset the views received for many decades cannot be accepted off hand. This can only be done when every doubt as to their accuracy is excluded, and here is involved the question as to whether the methods used by the investigators were those likely to produce trustworthy results. In undertaking a criticism on the publications of these authors, we are able to give an affirmative answer to that question, because we have not got to deal with statements resting on speculative or subjective, and, therefore, doubtful clinical hypotheses, or on complicated and often misleading experiments. We have to deal with facts, and the inferences drawn from them. Only to these will I refer, and not to those assertions which go beyond the directly observed facts.

**Theories Advanced
by
Investigators.**

Black has experimented on a great number of teeth as to their physical properties. He cut out equalized portions of the tooth bone and then, by means of a very delicate apparatus, he determined their specific gravity and the amount of salts of lime

contained in each, testing at the same time their power of resistance to pressure. Afterwards he simply arranged his results in statistical form in relation to the age, race and liability to caries of each specimen, publishing them to the world so that everyone might be convinced of the justice of his conclusions. Black thus gave us bare facts, of whose accuracy—the reliability of his instruments pre-supposed—we have as little reason for doubt as of any chemical analysis.

Almost simultaneously with Black, Williams made public the result of his histological and embryological studies of the construction of dental enamel. These likewise differed from the accepted views, and in as far as they treat of the present theme, they strengthen and confirm the conclusions which one is compelled to deduce from Black's experiments. Working from a totally different standpoint, Williams arrives at the same results as Black. Such a coincidence is usually regarded as being in itself conclusive proof. Moreover, when we affirm that the data of Williams are quite as reliable as those of Black—he also has mastered microscopical technic in a wonderful manner, and brings his specimens before us as micro-photographs, and not in the shape of those problematical drawings in which one never knows where truth ends and imagination begins—we may well say there is no ground for doubt as to the accuracy of the work of these two investigators. We must rather acknowledge that both have considerably enlarged the basis on which the theory of dental caries rests; and though the question of pre-disposing causes of caries may not thereby be thoroughly solved, yet they have rendered the great service of pointing out in which direction this problem should be approached.

When we examine the theories which have been held at different times as to the immediate origin of caries, we find that the idea of seeking for it in matters outside the tooth instead of looking for it in pathological changes in the tooth itself, we see, I say, that this idea arose at a time when in other branches of medicine new methods were being discovered and old ones perfected, so that it became possible for local appearances to be thoroughly investigated and their significance rightly interpreted. Until 1830 the old view was firmly held that dental caries was due to bad juices and inflammation in the tooth itself. A great stir was made when, towards the end of the thirties, Robertson and Regnard arose and denied any active participation of the tooth in process of caries, declaring all appearances to be the work of external acids. J. Tomes confirmed this view, and demonstrated conclusively by his histological studies that an inflammation in the hard tooth substance was an impossibility. In part, however, he agreed with the view of Thomas Bell, who ascribed a considerable activity to the vitality of the tooth tissues. I at-

tribute it to the authority of this investigator that the theory of the "vital reactionary power of the tooth substance" has today so many adherents. Magitôt showed by innumerable experiments that the most important appearance of caries can be explained by the action of acids; but he only did so in cases where the fermentation process had spread over a considerable surface. When bacteriology began its successful career it became possible for Leber, Rottenstein, Miller and Underwood, and particularly Miller, to show the part micro-organisms play in the origin and development of dental caries.

Since these investigations, we have learned that the immediate causes of caries is a chemical parasite. We know that amongst the micro-organisms, always present in the mouth, there are some whose function it is to transmute sugar into lactic acids; that in every spot on the teeth not scoured by the movements of the lips, cheeks or tongue, starch-and-sugar-containing food remnants lodge in which these acid-forming bacteria germinate, and begin their destructive activity. I withdraw the word "begin" because, strictly speaking, such a beginning was not observed; it was rather concluded *a posteriori*. It was only in decayed cavities, or in already decomposed tissues, that these micro-organisms could be demonstrated, and thus J. Tomes' oft-repeated objection was not invalidated, that the bacteria played a secondary part, being able to penetrate into the tissues only when these had already lost their vitality. It had been impossible to show specimens of the beginning of dental caries without the bacteria being washed away during the preparation of this section. It is only Williams's skill which has achieved this result. He shows in various examples the fungi *in situ*, and gives the following explanation*: "Lining the cavities or covering the surface where decay has commenced, there is always to be seen a thick felt-like mass of acid-forming micro-organisms. This mass of fungi is so dense and adhesive as to make it highly improbable that the enamel is affected, except in rare or special instances, by any acid other than that which is being excreted by the bacteria at the very point where they are attached to the enamel. The thick glutinous mass of fungi also prevents the excreted acid from being washed away, so it exerts its full chemical power upon the calcific tissue." According to that, when we speak of acids as the exciting cause of caries, we are not to understand those introduced into the fluids of the mouth or thereby engendered, but the particular one which, under the closely adhering fungus layer comes into immediate contact with the enamel.

* Pathology of Enamel, p. 54.

We see, therefore, that Williams not only agrees with the theory of Miller and his predecessor, but he reinforces it by new and very important evidence, so that no one can doubt that the processes take place as depicted by these authors.

If through these investigators the reason for believing that caries is occasioned by changes in the tooth itself has been taken away, we are the more disposed to believe in the connection of caries with variations in tooth tissues. The different attitude of teeth towards caries must have struck all observers. One has seen how, with mouths equally well cared for, in one case teeth would decay, and in another remain intact. Sometimes teeth would be rapidly ruined, sometimes remain long with only a superficial decay. In some individuals only a few teeth fall victims, whilst in others all suffer. Some teeth almost before their complete eruption would be decayed, whilst others would perform years of service before being touched by caries. The differences are then as regards (1) Origin of caries; (2) To the rapidity of its course; (3) Number of injured teeth; (4) The time of their falling victims. These differences may partly be explained by characteristics of tooth tissue, but also partly by influences lying outside the tooth.

The predisposing causes of dental caries in the tooth are: 1. Shape or form. 2. Density or structure. 3. Reaction or vitality.

In the first category belong the various defects
Shape or Form. of enamel as well as the imperfect form and position of tooth crowns, which are accompanied by irregular inter-dental spaces. Since the origin of caries has been discovered, these are known to be predisposing causes, inasmuch as they give opportunities for remains of food to lodge and accumulate. Now, Williams has raised a strong doubt as to the importance of such details, by showing that whereas on the one hand such imperfections appear in teeth quite free from caries, as in the case of certain animals, on the other hand in many carious human teeth such defects are entirely absent. He says*: "The facts brought out show that we may frequently find enamel of a markedly imperfect structure which has run the gauntlet of time for fifty or sixty years and is free from decay. We may frequently find markedly imperfect enamel in the teeth of animals, which very rarely or never suffer from caries. We frequently find enamel decaying rapidly which, from every test that can be applied to it, seems perfect in structure and composition." With the conclusion which Williams draws from his observations I am not entirely agreed, because they only go to prove that such defects are not essential to the origin of caries, and moreover that when they are present they are not sufficient alone to produce caries. But that they

* Pathology of Enamel, p. 42, 43.

ceteris paribus do not favor the development of caries is not shown by his specimens. This would be contradicted by daily experience, which shows that where, owing to such defects, the tongue cannot penetrate or the tooth be cleansed by the action of chewing, sooner or later caries sets in. We must therefore admit imperfect enamel and defects of shape to be amongst the causes predisposing to caries. This involves in practice the necessity of cutting out and carefully polishing superficial defects and fissures, and of filling approximal cavities with due regard to the proper shape of inter-dental spaces.

In order to explain these differences in the **Density or Structure.** origin and development of dental caries, nothing was simpler than to attribute them to the different density of teeth. And, in fact, we find these views laid down in various writings. Hard and soft teeth are alluded to, those which fell an easy prey to caries being designated as soft and imperfectly calcified, whereas those which resisted decay were held to be hard or dense. Black then appeared with his startling statistics. His tables show us that specific gravity and lime contents vary very little in individuals of the same age, and that, moreover, the bone of a decayed tooth would be as heavy and bear pressure as great, or even greater, than that of a perfectly sound tooth taken out of an intact mouth. He says: "This classification shows us conclusively that neither density nor amount of salts of lime has anything to do with susceptibility to caries." Also, "Teeth, which are rapidly ruined may be quite as well calcified, quite as firm and thick, as teeth in which no caries penetrates." It is evidently not the difference in the calcification of the teeth, nor the amount of lime salts they contain which is the ground of their different susceptibility to caries. It is just this fact, neither more nor less, which is taught us by Black's figures. They do not testify that there are no characteristics in the tooth bone which might explain their different powers of resistance to caries. Indeed, if we examine carefully we shall find that tooth structure does play its part here. as Black himself admits on several occasions. We have also ourselves made observations which go to prove that the structure of the tooth tissue, especially that of the enamel, influences the development of caries. Williams found that the interprismatic substance of the enamel is more quickly decomposed than the more evenly constructed and calcified prisms themselves, so that a larger proportion of interprismatic substance would occasion a more rapid spread of caries. The statements of Von Ebner are contradictory, as, in his opinion, the interprismatic cement is less easily decomposed by acids than are the prisms. The question will have to be settled later on; but, however it may be decided, it is sufficient now for us to know that enamel is composed of two substances which are differently affected by acids.

The statistics of Rose show that yellow teeth suffer less from caries than the gray-blue ones. We are bound to accept this opinion, because experience teaches that it is more often the yellow and cream-colored shiny teeth which are impervious to decay. Rose traces the yellow color to a larger proportion of magnesium salt, which also produces great hardness. As no quantitative analysis corroborates these views I cannot assent to them. I am much more of the opinion that the color of the teeth is due to their structure, more especially that of the enamel. We often see a considerable divergence of color in the teeth of one individual. Shall we ascribe it to a varying amount of magnesium contained? Often the canine tooth is yellower and has a more polished surface than the others. Might not this be because its structure is the firmest, as would be quite explainable from a phylogenetic point of view. It is not so much the color of the teeth as the brilliant or polished condition of their surfaces that we have to consider. The thicker the structure, the evenner the visible appearance of the teeth, the more will the light rays be reflected and the more shining their surface, whereas if they are dull the rays will be absorbed. The blue tint may be accounted for in the same way as the blue edges of the enamel. The transparent enamel is only a "dull medium" between the dark mouth cavity and our eyes.

Whereas, on the one hand, these observations might tell against the connection of tooth-structure and caries, they lose on the other hand much of their weight owing to the uncertainty as to whether they do definitely correspond to the liability to caries or whether they only happen to coincide with other symptoms which predispose to caries and occasion the differences. It would be difficult to silence the objection that shining yellow teeth only withstand caries better because their color coincides with a more perfect form and more regular inter-dental spaces.

Thus we see that the part which tooth-structure plays in the process of decay is far from being clearly defined. But at any rate we have good reason for believing that the structure of enamel is of great importance. The construction of the tooth bone is of far less moment, for as Williams very rightly says, so long as the enamel is intact the quality of the bone matters little, and when once the enamel is penetrated even the most perfect dentine cannot withstand caries. This does not in the least diminish the value of Black's services, for the significance of his physical researches does not lie in his having explained the question of predisposing causes of caries, but in his having pointed out that the amount of lime contained in the teeth is a constant one, admitting of little change. He has therefore once for all decided that teeth do not decay because they are soft, and he has cut the ground away from under those who seek by the introduction of lime salts to make the teeth hard, or more capable of resistance.

“We must be prepared to admit that the dentine is possessed of vitality, and that the vitality must have been lost before the tissues undergo decomposition.” Again and again since Tomes wrote that do we meet with the theory that the tooth tissue can react more or less against caries and thus modify its development. This is perhaps natural when we consider that apart from the hair and nails the other parts of the organism do exercise such a reaction against the intrusion of disease. But then the circumstances are quite different. Even the compact bones possess in the Haversian canal blood vessels and connective tissue. All the requisites for reaction are there. If the vesselless cornea be irritated, the blood from the “limbus” flows in and sets up a reaction which is a kind of inflammation. But how could such a process take place in dentine without blood vessels or connective tissue? The pulp naturally does possess reactive capabilities. If the odontoblasts be irritated they form a secondary tooth bone, and as soon as the tissue formed by them is calcified the pulp is protected against the intrusion of caries. But the dentine itself possesses no such reactionary power, and I disagree with the writings of authors who, like Magitôt, Wedl, Walkhoff, Miller, and Rose, see in transparent tooth bone the result of such reaction. Rose, for instance, says: “In spite of all, even in the tooth bone, there are lively movements of defence. The protoplasmic fibres, after an active metabolic change, form into more or less dense masses of transparent tooth bone as their most effective protection against the intrusion of caries. On that side of the protecting wall the fibres in the dark zones of the tooth bone carry on active warfare against the intruding chemical and parasitic evil. They get into a state of inflammation, and they die away at last in granular fragments.”

In the first place the tooth bone fibres cannot produce inflammation as there are no blood vessels, leucocytes, or connective tissue. We can find in the little canals of decayed tooth bone various forms of micro-organisms, and also degenerate productions of the fibrillæ, but no inflammatory infiltrations. I do not know, therefore, upon what histological discoveries Rose can base his remarks about inflammation. Again, I must deny that the tooth bone fibres can construct new bone. The error lies, I think, in not keeping sufficiently distinct the two entirely different processes of the formation of secondary dentine and the senile calcification of fibrillæ. The only thing which the two processes have in common is calcification. The one is a formative, and the other a degenerate process. If really transparent bone is formed, this is only done by the calcification of the peripheric part of the fibrillæ owing to

an interruption of the nutritive supply. But that the fibrillæ can form tooth bone "as the most effective protection against the intrusion of caries" is not possible, as dentinal tissue can only be built by the odontoblasts, and a layer of lime salts will only be present when the nourishment is lessened. The transparent zones in decayed tooth bone are therefore not due to the calcification of the fibres, but to the effect of the acid bacteria acting upon the tissues, and causing refraction, so as to produce the phenomenon of transparency.

If one deny the possibility of reactive power to the dentinal tissue, still more surely can there be no possible suggestion of a vital reactive action in enamel, as enamel possesses no power of metabolic change, being only petrified tissue with hardly any organic substance left in it. As Williams says*: "Enamel is a solid mineral substance, and the finest lenses reveal not the slightest difference between enamel ground moist from a living tooth and that which has lain in the earth for centuries." And again†; "All changes taking place in fully formed enamel must be the result of some agent acting from without, and against the action of any external destructive agent this tissue has no greater power of reaction than has sugar or salt of reacting against the water in which they are dissolving."

We see, therefore, that of the first group of predisposing causes, the first item was true, the second doubtful, the third alleged, but without reason. The causes considered have been congenital and unalterable. One can guard against their pernicious results, but one cannot prevent their existence. As regards the predisposing influences that are not in the tooth itself, the case is otherwise. For if such influences be present, they are capable of alteration, and subject to medical treatment. Hence, these are far more important from a prophylactic standpoint than those of the first group. Unfortunately, however, our knowledge as regards them is very incomplete, and the certainty with which we could speak of the first group ceases. It remains for future investigators to elucidate these problems.

The three predisposing influences outside the tooth are: (1) Food; (2) The gums; (3) The fluids of the mouth.

Food. As it is the remnants of food which, as breeders of bacteria, produce caries, it is easily understood how the nature of that food modifies caries. That

I do not refer to acids introduced by food I have before mentioned. We know that sugar and hydrocarbon form the nourishment for micro-organisms and that consequently the richer food is in sugar, the more

* Structure of Enamel, p. 79. † Pathology of Enamel, 16-17

favorable it will be for the development of bacteria. Hence the saying that confectioners, millers and bakers are predestined to caries by virtue of their trade. Then the question arises as to the hard or soft properties of food remains, as it is far from unimportant whether hard particles remain, which irritate the soft parts of the mouth, or soft, pappy bits which cling in between the teeth. The chalky contents of water will exercise no influence over perfected teeth. Whatever effect may be attributable to this cause can only exist by way of an hereditary improvement in tooth structure.

As this is foreign to my subject, I will not enter into the question nor into the precise amount of influence attributable to our eating cooked food.

The Gums. The gums (anatomically) may have a predisposing influence on caries in two ways. First, in that the inter-dental papillæ which normally fill out the inter-dental spaces, may for some reason or other recede so that food-remains may get between. Secondly, that owing to gingivitis the gum may swell out so that between the gum and the fang of the tooth there may be a hollow in which phlegm and food-remains may accumulate and stagnate.

Oral Fluids. The fluids of the mouth have been kept to the last, not because the part they play is the most insignificant, but because we know least about them. These fluids have often been examined and analyzed as regards their chemical and "bactericidal" properties, but as yet it has not been successfully shown how they modify the process of caries. That they do play an important part is shown by various circumstances. We see that the lower front teeth are seldom attacked by caries, and this is attributed to the fact that they are always bathed in saliva. We see that in a closed cavity the process of decay is rapid, whereas if a wall of the cavity breaks away, the process is retarded by the exposure to the fluids. But there is other evidence to show their modifying influence. Of this I spoke before the last conference of this section, and I will not repeat it here. Only the most important influence I must bring before you again, and that is *periodical disposition*. If it be true that there are such periods with an unaltered diet, they can only be accounted for by the changed conditions of the fluids of the mouth. As the predisposing causes of which I treated in the first group were congenital and unalterable, they cannot occasion a temporary disposition. That temporary liability does exist, cannot well be doubted, as nearly every writer on this subject quotes instances in which periods of undoubted susceptibility alternate with those of immunity from caries. Besides, it is an accepted opinion that

chlorotic girls and those in puberty or pregnancy are more susceptible to caries. For members of the profession, I should like to mention two cases of women whom I recently treated, aged respectively forty-two and forty-five, who, although they had both been confined many times, preserved their teeth intact until after the cessation of the menses, when in one three and in the other eleven cavities quickly developed. But from such isolated cases, no definite conclusions can be drawn. Such questions can only be solved by statistical investigations. In this connection the question of the influence of pregnancy should also be considered. Having beforehand assured myself that Professor Achovy thought it worth while to point out a connection between caries and pregnancy on a statistical basis, I have also begun a systematic investigation of the mouths of those pregnant. I will not anticipate the results of those investigations, which will affirm the undoubted view of a predisposition to caries in the pregnant. It remains to be shown that this predisposition does *not* occur, or the teeth grow soft during pregnancy because they are drained of lime salts, necessary for the development of the bone system of the foetus. This is shown by what I have already quoted from Black's work, and I must add that he did not find that the teeth of women who had borne many children were any poorer in lime salts than those in other cases. Black has thereby indirectly shown that the teeth of those pregnant do not decay through loss of lime salts. To those who believe in a vital process *in* the teeth these figures of Black's will not be convincing. The lime may be restored after the confinement. Where a withdrawal of tissue elements is possible, their substitution should also be possible. Therefore, allow me to prove to you, by other evidence, that during pregnancy the teeth are not the poorer in salts of lime. The view that teeth may be deprived of salts of lime for the benefit of the foetus arises out of the false idea that the organism remedies a deficiency by giving of its own. What experience gives us reason for believing so unusual an exception to the general economy in metabolic change? Is it not more probable that the organism supplies the increased demand for lime salts by better assimilating it from the nutritive supply? The poorest food contains lime salts enough for both mother and foetus. Above all one must not leave out of account the fact that the tissues do not vary as regards their ingredients, and that their chemical composition is the steady pole in the fluctuating phenomena of nourishment and assimilation. We do not find any indication that the organism of the pregnant is lacking in lime salts. The waste of phosphate in the urine is not less. With more reason we might believe in an excess of lime when we consider that in half the cases of pregnancy osteophytic growths are formed.

But even supposing that the lime in the food is insufficient, the organism would draw it out of the bones and not from the teeth, since the process would be attended by inflammatory symptoms which are possible in the bones but not in the teeth. That such is the case is shown in osteomalacia. In this rare, and in its essence, little understood disease, which sometimes occurs in pregnancy, the bones of the frame, the extremities and even the skull have been known to soften, but never the teeth. This is to be explained by the fact that in osteomalacia we have to deal with changes in the bone which histologically are hardly distinguishable from inflammation.

We see, then, that the hard tooth substance suffers no change, and that temporary liability can only be explained by a change in the fluids of the mouth. These fluids can modify caries, in that they dilute or wash away remnants of food; secondly, by neutralizing by chemical means the developing acids; and thirdly, by containing in a greater or less degree, ingredients which impede the activity of the bacteria. This last point is the most important and most interesting of all, and just on this one we have no positive knowledge.

However, when we consider the present aspect of the problem of the predisposition to caries, as I have endeavored to sketch it in this brief paper, when we take into consideration how the results of Black and Williams oblige us to transfer the ground of our investigation from the teeth to their environment, we may well be hopeful that even to this difficult and at present obscure question a satisfactory solution may yet be supplied.

Comments by Dr. J. Leon Williams on the Foregoing Paper.

This paper by Dr. Biro seems to me to be the best resume of our present knowledge of the subject of dental caries that has appeared. I am entirely in accord with all that he says with the exception of one or two statements, but these exceptions contain matter of such importance that it will be better not to pass them over in silence. I refer especially to his use of the term "predisposing cause." In my recent reply to Dr. Truman in the *Dental Cosmos* I expressed the opinion that this term was being used in a careless and unjustifiable way by those who are familiar with the facts, and that such use of the expression "predisposing cause" as is constantly being made is calculated to mislead those less familiar with the present scientific aspect of the question. I have not reached or stated the conclusion, as intimated by Dr. Biro, that tooth form, posi-

tion and structure are factors of no account in the problem of dental caries. This error has arisen with him, as it has with others, through my insistence on a logical use of the term "cause." My point seems to me so perfectly self-evident that I am surprised it should ever have been misinterpreted. Cause and effect are ever unalterably related. The cause of any effect must always be an absolutely necessary antecedent. The International Dictionary defines cause as "that from which anything proceeds, and without which it would not exist." The whole gist of the matter lies in that definition. I have shown conclusively by the evidence from the teeth of many animals that never suffer from dental caries that defective tooth structure is not a necessary antecedent of caries. And if not a necessary antecedent, it cannot properly be spoken of as a cause. My reason for discarding the term "predisposing cause," as applied to defective tooth position, shape, and structure, is therefore first a purely logical one, and inasmuch as out of this illogical use of the term has come the fixed belief in the minds of the large majority of the dental profession that defective tooth structure is primarily the explanation of caries, this is a further important reason for getting rid of the misleading expression. The facts are, as all admit, that teeth defective in shape, position, and structure, *may not* decay, and that the most perfectly formed and arranged teeth *may* decay. I say, therefore, that the use of the term cause, as applied to these conditions, is illogical and misleading, and should be abandoned. But having said this I hasten to add that I have no disposition to minimize the importance of these conditions as regards their influence upon the degree of rapidity of decay when this is once brought about by the true predisposing and active causes, the true predisposing cause being some condition of the fluids of the mouth and mucous membrane, not yet understood, which favors the development and activity of acid producing bacteria, and the true active cause being the acid produced by these micro-organisms. Logical definitions are sometimes important and this appears to be one of the occasions where it is important to use correct terms.

The only other point in Dr. Biro's paper calling for critical comment from me is his implied doubt as to whether my statement that von Ebner is wrong in saying that acid first attacks the center of the enamel prisms is correct. Dr. Biro seems to think this is still an open question. I do not see how he can so regard it in view of the plain facts shown in my photography. But the experiments for determining this point are so easily made by any one who has a microscope, that it should have been settled long ago. The first effect of an acid applied to a section of enamel prepared for microscopic examination is to render the enamel rods more distinct. This effect is produced by the acid acting more

rapidly on the inter-rod or cement substance, as any one may see by watching the margin of the section, where the ends of the rods will soon be observed projecting beyond the cement substance between them. The continual action of the acid leads to the complete isolation of the rods, so that they fall apart if touched. Aside from these points I have nothing but hearty commendation for Dr. Biro's paper, which is not only a most excellent summing up of our present position, but it also points out the direction in which future investigation should proceed for the further clearing up of the problem of dental caries.





The National Association of Dental Examiners.

Notice is hereby given that the next annual meeting of the National Association of Dental Examiners will be held at Washington, D. C., commencing at ten o'clock a. m., Thursday, October 13, and continuing in session the 14th and 15th. The headquarters will be at "The Hamilton," Fourteenth and K streets, opposite Franklin Park; the rates will be \$2 and \$2.50 per day.

Members can communicate with Dr. H. B. Noble for additional information regarding accommodations.

The poll vote closed August 9, with 72 votes for Washington, 20 for Louisville, 17 for Chicago, and 12 for Omaha, balance scattering.

CHARLES A. MEEKER, Secy.,
29 Fulton street, Newark, N. J.

Vermont State Board of Dental Examiners.

The next meeting of the Vermont State Board of Dental Examiners will be held at the Pavilion Hotel, Montpelier, October 18, 1898, 2:30 o'clock in the afternoon.

GEO. F. CHENEY, Secy.,
St. Johnsbury, Vt.

Southwestern Michigan and Northern Indiana Dental Societies.

The joint meeting of the Southwestern Michigan and Northern Indiana Dental Societies will be held at Elkhart, Ind., Sept. 21-22, 1898. A full programme and many interesting features. All are cordially invited.

F. H. ESSIG, Secy.,
Southwestern Michigan Dental Society,
Dowagiac, Mich.

Eastern Iowa Dental Society.

The tenth annual meeting of the Eastern Iowa Dental Society will be held in Iowa City, Iowa, Nov. 16, 1898. An interesting programme is being prepared. All members of the profession are invited to attend.

I. S. MAHAN, D.D.S., Secy.,
La Porte City, Iowa.

Ohio State Board of Dental Examiners.

The Governor of Ohio has appointed the following gentlemen as members of the State Board of Dental Examiners: A. F. Emminger, D.D.S., president, Columbus, O.; L. P. Bethel, D.D.S., M.D., secretary, Kent, O.; O. N. Heise, D.D.S., M.D., Cincinnati, O.; M. H. Fletcher, D.D.S., M.D., Cincinnati, O.; W. A. Price, D.D.S., Cleveland, O.

Missouri State Dental Association.

At the thirty-fourth annual meeting of the Missouri Dental Association, Planters' Hotel, St. Louis, Mo., July 5-8, 1898, the following officers were elected: Dr. F. M. Fulkerson, Sedalia, president; Dr. F. F. Fletcher, St. Louis, first vice-president; Dr. W. L. Reed, Mexico, second vice-president; Dr. B. L. Thorpe, Billings, corresponding secretary; Dr. H. H. Sullivan, Kansas City, recording secretary; Dr. J. A. Price, Savannah, treasurer.

B. L. THORPE, Cor. Secy.,
Billings, Mo.

Rhode Island Dental Society.

The twenty-second annual meeting of the Rhode Island Dental Society was held on the 12th of July, at New Cliffs Hotel, Newport, R. I. Officers elected for the coming year: President, C. J. Allen, D.D.S., Providence; Vice-President, V. J. Baggott, D.D.S., Providence; Secretary, C. M. Carr, D.M.D., Newport; Treasurer, H. W. Gillett, D.M.D., Newport; Librarian, D. F. Keefe, D.D.S., Providence. Executive Committee—R. L. Davis, D.D.S., Woonsocket; W. R. Howard, D.D.S., Newport; J. A. Lynch, D.D.S., Providence.